final report

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GS1 Integration at Nolan Meats

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Executive summary

The red meat industry is under ever increasing pressure to improve its supply chain traceability. Since the outbreak of mad cow disease, countries importing beef products are demanding higher levels of trace back in the event a recall is ever necessary.

Australia has a reputation for producing high quality beef products. To back up this level of high quality we need to provide assurance to our customers that we have full supply chain traceability.

Currently, most beef processors have efficient traceability systems within their own company, but what happens if product is moved to another company before reaching customers?

Currently within the beef industry there are several factors which hamper supply chain traceability:

- Differing Barcode Standards: For a company consolidating product from many different establishments, it can be quite difficult to scan every different type of barcode in their system.

- Archaic or Non-Existent Data Transfer: To maintain accurate records for product consignments, individual records need be transferred with the load. Currently, supply chain partners either don't support this operation or it is paper based.

The "GS1 Integration at Nolan Meats" project provides the systems to overcome these issues. The solution utilises a system provided by globally recognised GS1 – (European Article Numbering).

The "GS1 Integration at Nolan Meats" provides the solutions by:

- Applying Standardised Barcodes: Standardised barcodes will allow all members throughout the supply chain to scan and recognise every establishment's barcodes. Using these standardised barcodes, even customers overseas can scan the barcodes because they are a globally unique barcode.

- Utilising Standardised Electronic Messaging: After the implementation of GS1 barcodes, consignments can utilise standardised electronic messaging for information flow between supply chain members. The electronic messages have even been adapted for live animal transfers, allowing for full paddock to plate electronic traceability.

With the implementation of electronic messages, not only will supply chain traceability be greatly enhanced, but cost savings will also result from this system. The cost savings experienced can be immediate. For example, completing electronic forms instead of paper forms can validate against data entry errors, and greatly eliminate the need for data entry on the receiving end. In the long term, it can significantly reduce trace back times and more accurately trace back product compared to manual paper forms.

The overall goal of the system is to demonstrate to the industry the benefits of the GS1 system. The system provides greater supply chain traceability and cost savings to all members of the supply chain. With industry wide adoption of the system, the Australian Beef industry can satisfy its customers, both internationally and domestically, that we provide the highest quality product with the traceability systems to support it.

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1 Introduction

The Queensland Government Department of State Development and MLA are undertaking a number of e-Business projects across Queensland under the banner of Qe-Meat. The Qe-Meat project 2 involves implementing more reliable data management methods across all business units and trading partners, of which Nolan Meats is a major partner. For the Qe-Meat 2 project to be successful it will require the modification and enhancement of Nolan Meat's information management systems and the incorporation of standardised GS1 bar coding and electronic messaging. For the Qe-Meat project to succeed as a whole it will require the successful integration of GS1 compliant systems throughout all points within the supply chain. Only then will the project achieve its goal of demonstrating the benefits of e-Business and its application in the red meat industry.

The GS1 integration at Nolan Meats project comprises of several well defined stages of implementation, with the overall goal of the project to become a fully compliant GS1 e-business facility. At the completion of the project, Nolan Meats will have completed a vital link in the Qe-Meat Project 2. To accomplish this goal the project was broken down to several stages of implementation. Thus allowing the project to be "Phased In", and allowing each stage to be assessed. The project has been broken into the following stages:

Stage 1 – Investigation
This stage will investigate where the company could possibly improve with GS1 compliant technology.

Stage 2 – Implement GS1 Barcodes
To implement GS1•UCC compliant barcodes throughout the facility as investigated in Stage 1.

Stage 3 – Electronic Messages
Implement GS1COM® messaging where applicable to create an GS1 compliant e-business facility.

Stage 4 – Post Implementation Review
Perform a post implementation review for the purpose of evaluating the effectiveness of the GS1 system throughout the company.

This report will document each of the stages involved in the implementation of GS1 technology at Nolan Meats.

2 Stage 1 - Investigation

2.1 Existing System at Nolan Meats

Nolan Meats operations include a significant number of stages throughout the supply chain. These include feed lotting, processing, boning, distribution and recently exporting. However a significant amount of cattle processed at our Gympie plant is acquired from 3rd party cattle suppliers, completely bypassing our feed lotting operations.

Currently all Nolan Meats cattle purchases for our feed lotting operations are inducted into our feedlot. During the induction process the current system records each animals Dentition, Breed, Sex, weight, Ear Tag and NLIS which are sent electronically to our head office in Gympie. After the induction process, the cattle may be transferred to other feedlots, but all cattle are grain fed for the required number of days before being sent to be processed.

When cattle are transferred to our Processing Facility, the cattle weights are manually recorded on paper then NVD, MSA and NFAS Declarations must be manually filled out. The same situation occurs when cattle are transferred to other feedlots or when other producers send cattle to our Processing plant. This information then needs to be manually entered into our system.

When cattle are slaughtered, their tail tag, NLIS tag and other details are entered into our system. The NLIS information is stored for future integration with the NLIS database system. After slaughter, the eligible cattle are MSA graded where a DNA smear is taken. This offers the traceability from slaughter to plate currently available in our system.

After the cattle have been MSA graded, this information is transferred from the MSA handheld devices into the system. Each kill lot of cattle is then costed and feedback sheets are generated for the producer. These feedback sheets are then either mailed and/or faxed to the producer. A duplicate feedback sheet is the printed and filed for Nolan Meats' records.

After Boning, the cuts are placed into boxes and a propriety format barcode is applied. This current barcode is not compatible with GS1 format barcodes. The barcode is then used for carton movements and issuing to orders. An example of the barcode is shown in figure 1.

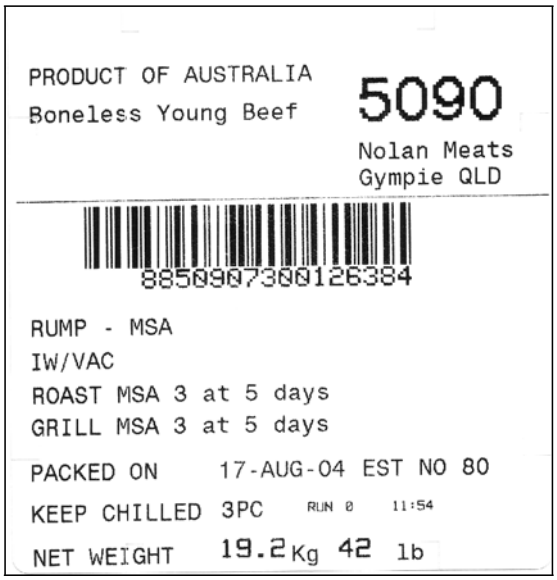


Figure 1 – Example Carton Barcode

Nolan Meats have also implemented pallet labels for ease of distribution and ease of warehousing. The pallet labels are GS1-128 coded serial numbers in which our system holds the information relating to every carton on the pallet. An example of a pallet label is shown in figure 2.

Figure 2 – Example Pallet Label

When transferring cartons of product between Gympie and Morningside, a MTC must be manually filled out and accompany the load. This is a requirement of AQIS which ensures the product is eligible for export. We also print out a carton report to accompany the shipment which contains every carton's barcode.

Finally when cartons are loaded out to orders, each barcode is scanned with handheld scanning devices and recorded in the system. An invoice or delivery docket is then generated and accompanies the load.

2.2 Potential Improvements in the Existing System at Nolan Meats

In Nolan Meats current system there have been many bottlenecks identified and other areas which have been identified as needing improvement. One of the biggest areas which need improvement is the double entry of data. This is of major concern because it is time consuming, wasteful and has the greatest potential for errors. Another area of concern is communication internally between departments and between Nolan Meats' customers and vendors. To ensure Nolan Meats continues to provide quality products and service second to none, communication has been identified as the vital key. The implementation of the GS1•UCC system will have advantages in lowering the number of physical documents and sending electronic versions instead. Areas within the current system which can benefit include:

- Combining NVD's, MSA Declarations and NFAS Declarations into an electronic version
- Notifying Consignors of Receipt of cattle electronically
- Sending Producer Feedback Electronically
- System Generated electronic MTC's (Meat Transfer Certificates)
- Sending Consignment information electronically to Major Customers/Distributors
- Receiving notification of receipt of goods by customers

With the current system at Nolan Meats, communication between trading partners is basic and still largely paper based. The diagram in figure 3 demonstrates the significant flows of information between trading partners of Nolan Meats.

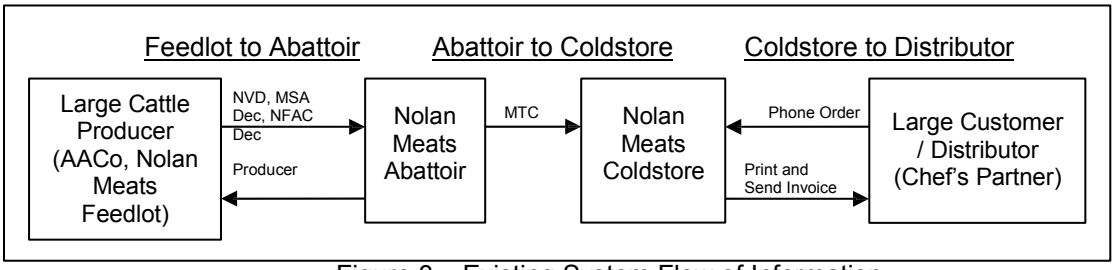


Figure 3 – Existing System Flow of Information

The areas for potential improvement have been broken down into each individual flow of information between trading partners.

Cattle Dispatch and Receiving
- Manual entry of 3 separate forms – duplicate data entered
- No notification sent to Consignor of cattle received successfully
- Paper work must be filed and kept for a minimum of 2 years
- Difficult and time consuming to trace back through the paperwork

Sending Vendor Feedback
- Each individual lot must be printed and mailed to the vendor
- The feedback sheets must then be filed and kept
- Difficult and time Consuming to trace back through the paperwork

Transferring between Abattoir and Coldstore
- Manually fill out Meat Transfer Certificate
- Must be signed for and returned from destination

- Must be filed at both the source and destination locations
- Difficult to trace back through the paperwork

Dispatching Product to Major Customers
- Scan out order
- Print Invoice
- No confirmation that product has been accepted by the customer
- Customer does not know before hand exactly what quantity of product is being sent. (In terms of number of cuts and exact weight)

2.3 Potential Outcome of GS1 System at Nolan Meats

With the integration of GS1 barcodes and the implementation of GS1COM® messaging at Nolan Meats, the areas mentioned in the previous section should show significant improvement.

The future GS1 system will replace much of the laborious paperwork to be filled out by the feedlot operators and be replaced by the e-DEC system. The e-DEC system will print physical documentation to accompany the load as well as automatically sending the load information electronically to its destination ahead of the load allowing the consignee to verify the load contents when it arrives. The consignee will then send a reply message back to the consignor acknowledging the successful receipt of the load or identify any errors. The system will keep track of loads with any errors reported or loads which have not been acknowledged with a reply message. This will allow consignors to ensure all loads and their contents are accounted for.

The future system will negate the need to manually print feedback sheets. The system will automatically generate an electronic feedback sheet and forward it on to the producer. Once received the producers system can automatically match the feedback details with the cattle's details in their own system. The system will save time & money by eliminating the need to physically store the feedback sheets or having to post or fax the details to the producer. It will also have the added benefit of faster searching for documents. With the feedback sheets stored electronically, reconciling trace backs will take only a few minutes.

The future system will replace the manual handwritten completion of MTC's. The system will automatically generate an e-MTC with the details of all the cartons' GS1 barcodes. A replica MTC can be produced to accompany the load if required. The e-MTC will be forwarded to Morningside, or any other cold store facility, with the load's details so they can easily reconcile the load when it arrives. Once the load has been accepted into Morningside a reply message will be sent back acknowledging the receipt and report if there are any errors. The consignor of the load will have an electronic record of all messages replied to and any left outstanding.

The future system will provide a system for checking that customers receive their loads in full. Once an order has been filled, a dispatch advice will be sent electronically to the customer with all the details of the consignment. The customer will know ahead of the consignment the exact details of what is being dispatched. The customer can then scan the delivered product into their system and send a received message back to Nolan Meats detailing the successful receipt or any errors in the delivery.

With the full system implementation of GS1COM® messaging, the supply chain process would resemble the diagram in Figure 4.

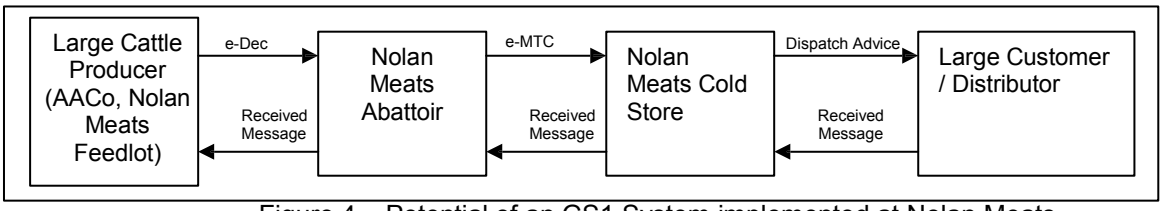


Figure 4 – Potential of an GS1 System implemented at Nolan Meats

The final outcome would be a system with less time consuming paperwork, more efficient transfer of stock and a much better trace back ability.

2.4 Methodology

The implementation of an GS1 compliant system at Nolan Meats would not be practicable to implement all at once. The GS1 implementation at Nolan Meats will be phased in during the course of the project, ensuring each stage is working successfully before proceeding to the next. The implementation will proceed as follows

1. Ensure GS1•UCC Barcodes are applied to cartons
    - Acquire GS1•UCC capable hardware
        - GS1•UCC Barcode Printers
        - GS1•UCC Barcode Scanners
    - Develop software to scan GS1•UCC format Barcodes
    - Develop software to create/print GS1•UCC Barcodes

2. Apply GS1•UCC Barcodes to logistical units
    - Develop software capable of printing GS1•UCC SSCC labels

3. Implement e-Messaging
    - Develop GS1COM® messaging tool
        - Develop e-DEC Module & Integrate into current system
        - Develop Vendor Feedback Module & Integrate into current system
        - Develop e-MTC Module & Integrate into current system
        - Develop Dispatch Advice Module & Integrate into current system
        - *Develop Additional Modules for Future e-Messaging*

After the implementation of each of the stages throughout the project, the benefits of the system should be noticeable. This structure of implementing the system should have the least impact on operations as each stage will be thoroughly tested before being brought into live production. Along with the development of the GS1COM® electronic messaging, there will need to be discussion with the other members in the supply chain to agree on the format of data transmitted and received. Although the structure of the GS1COM® message is standardised, the type and volume of information contained within is not. For example, some customers may not need the serial number of every carton sent in the message.

2.5 Measurements of Current System at Nolan Meats

Cattle Dispatch & Receiving
(for 100 head of cattle)

Task	Time Spent Without GS1	Time Spent With GS1	$ Saved
1. Record induction of cattle with weights, vendor's NVDs, market access and drugs used for individual animals	(100 × 40 sec) 67 Mins	(100 × 30 sec) 50 Mins	$51
2. Produce waybill, NVD, MSA, NFAS Declarations. Records kept & filed for required period	20 Mins (per lot)	4 Mins (per lot)	$16
3. Reconcile load and acknowledge receipt	10 Mins (per lot)	3 Mins (per lot)	$7

Sending Vendor Feedback
(feedback sheet per lot)

Task	Time Spent Without GS1	Time Spent With GS1	$ Saved
1. Produce Vendor Feedback and forward to producer	5 Mins	30 sec	$10
2. File Vendor Feedback	1 Mins	0	$2

Transferring Between Abattoir and Coldstore
(for 672 cartons)

Task	Associated Cost Without GS1	Associated Cost With GS1	$ Saved
1. Scan cartons to truck from Abattoir	(672 × 0.12) $80.64	(672 × 0.12) $80.64	$0
2. Prepare MTC for Coldstore	$15	$0	$15
3. Scan cartons into Coldstore	(672 × 0.12) $80.64	(672 × 0.12) $80.64	$0
4. Complete MTC and return to Abattoir	$15	$0	$15
5. Reconcile MTC and File	$15	$0	$15

Dispatching Product to Major Customers
(for 672 cartons)

Task	Associated Cost Without GS1	With GS1	$ Saved
1. Pick order and scan out to Customer	(672 × 0.12) $80.64	(672 × 0.12) $80.64	$0
2. Coldstore produces and distributes Delivery Dockets	$5	$0	$5
3. Customer Scans cartons into their system	(672 × 0.40) $268.80	(672 × 0.12) $80.64	$188.16
4. Customer acknowledges successful receipt of cartons	$10	$0	$10

3 Stage 2 – Implement GS1 Barcodes

3.1 Implementation Overview

After the identification of products which would benefit by the implementation of GS1•UCC Barcode technology, the process of implementing these changes began.

Areas which where identified as potential for improvement with the GS1•UCC barcode symbology are:

- Carton Barcodes
- Carcass Barcodes

To apply GS1•UCC barcodes to both carcass tickets and carton labels, it was determined that our existing software would require modification. During consultation with our software supplier, the following three programs were identified as requiring modifications:

- Carton Weigh Software (This software produces Carton labels with barcodes)
- Slaughter Floor Software (This software produces Carcass Tickets with barcodes)
- Carton Loadout Software (This software is used to scan the barcodes associated with the Cartons)

During consultation with our software supplier, it was also identified that new printers would be required to print GS1•UCC compliant carton labels.

Once the software modifications have been made externally, the process of rolling in the new changes began. This process proceeded as follows:

Pre-Implementation

1. Design new carton labels to fit the larger GS1 barcode
2. Create new internal codes to differentiate between products with the GS1•UCC barcodes and products which have a SASTEK™ barcode.
3. Train Staff how to read the new barcode format

Implementation

4. Install and test Carton Loadout Software to ensure it will scan the barcodes successfully.
5. Install the Slaughter Floor Software to ensure carcass tickets are compliant with GS1•UCC
6. Test the Carton Weigh Software and produce a trial number of GS1•UCC barcodes to test readability and reliability throughout the system.
7. Modify printer cabinet to accommodate new printers.
8. Install Printer and Carton Weigh Software for all cartons to be produced with GS1•UCC barcodes.

Post Implementation

9. Post Implementation Review

3.2 Pre-Implementation

3.2.1 New Label Design

Currently Nolan Meats Pty Ltd uses carton labels with a dimension of 95 mm × 100 mm. With the implementation of GS1•UCC barcodes, comes the need to review the layout of our existing labels. This is due to the GS1•UCC barcode being significantly larger that the existing SASTEK™ barcode. However the main catalyst for change is that the new printers have completely different layout settings compared to our existing printers. It was also important to note that due to the size of the GS1 barcode is was a possibility the barcode would not fit on our existing labels.

After experimentation, it was discovered that the GS1•UCC barcode would fit successfully on our existing media. With the introduction of the longer GS1•UCC barcode, a decision had to be made on what height we should make the barcode. Foremost in the decision making process was compliance with "GS1 Australian Meat Guidelines", but we also had to keep enough room to fit our mandatory labelling requirements. The recommendations for the height of GS1•UCC barcodes with handheld scanning devices is 25 mm, but no less that 13 mm in height. Our previously implemented SASTEK™ barcode is 11 mm in height. It may seem that to achieve the minimum required measurement (hence compatibility), that the barcode height be increased by 2 mm. However, because of the extra length of the barcode, it would seem almost impracticable to set the barcode to 13 mm in height. This is because the user scanning the barcode would require more precise control of the barcode scanner hence decreasing speed. An example of barcode heights versus the user's ability to scan them precisely is shown in figure 5.

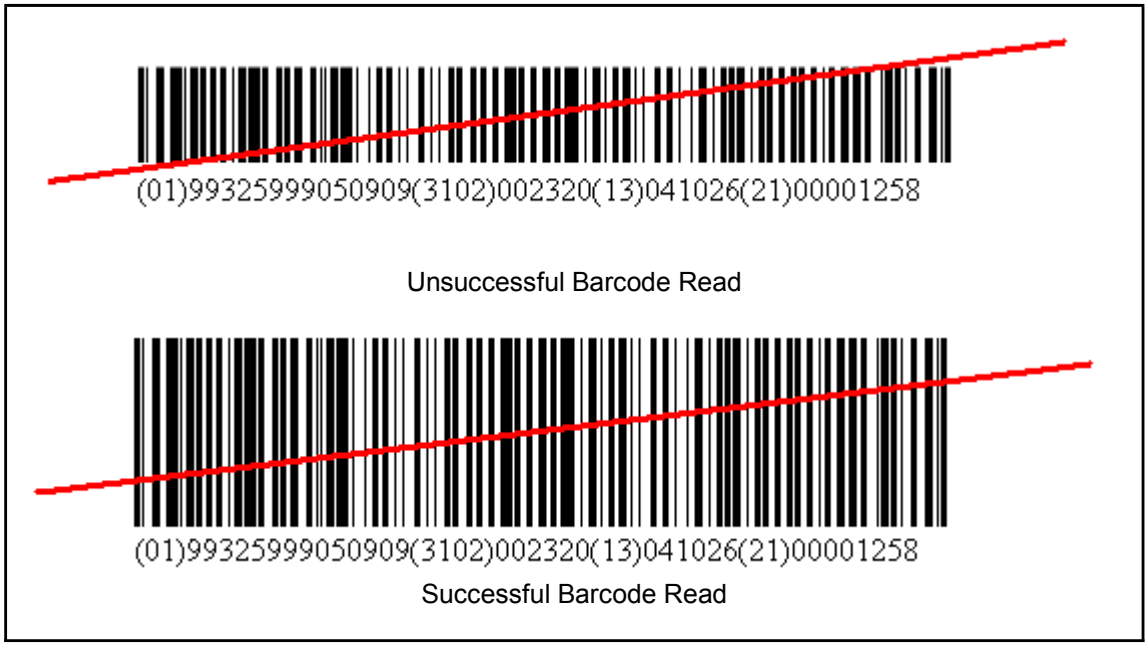


Figure 5 – Barcode Height versus ease of scanning

As shown in the figure above, the higher the barcode lines, the more "user friendly" the barcode is for handheld scanning. During the design of the labels a compromise was made between ability to scan the barcode and ability to fit required information on the label. Ultimately, the barcode height was set to 18 mm. Using the barcode as the reference point, the rest of the label was designed to contain all the required information and be as aesthetically pleasing as possible.

3.2.2 Creation of new internal codes

Nolan Meats currently operates a carton Coldstore in Brisbane which is capable of holding in excess of 25,000 cartons at any one time. To ensure that the transition to GS1•UCC barcodes occurs smoothly, new internal product codes were created to distinguish between cartons which have an GS1•UCC barcode or a SASTEK™ barcode. Another reason for creating new product codes is that the scanning software will not recognise products with the same internal code but have different barcode symbology. For example, if the system has 5090 associated with a SASTEK™ barcode, the scanning software will not recognise a 5090 in an GS1•UCC barcode.

Another important reason to get the new codes right, is that GS1 stipulates that product code numbers cannot be reused within 2 years of the last product being produced. For Nolan Meats this stipulation will be most important because we have chosen to use our internal codes as our GS1•UCC barcode codes.

To assist with the introduction of the new barcodes, our internal coding system has been standardised. This was done due to the ever increasing number of products being produced by Nolan Meats. An example of our 4 digit product code is as follows.

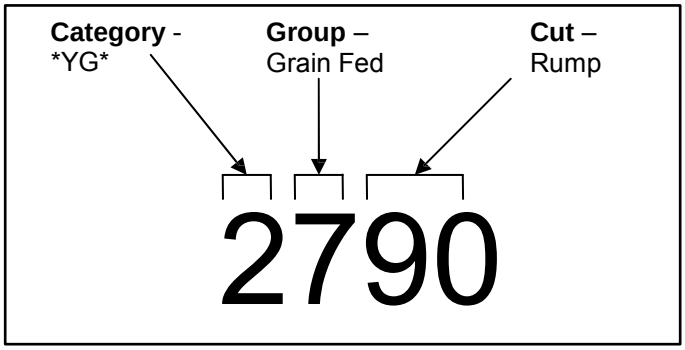


Figure 6 – Product Code Example

The new product codes have been created to coexist with our existing product codes and to allow for the creation of many new categories/groups of product codes. Nolan Meats previous system of coding could not allow for this as internal product codes were spread over too large a band of numbers.

3.2.3 Staff Training

As with any new system, the end users (Nolan Meats Staff), needed to be trained how to interpret the new barcode. Because of the structured format of the GS1•UCC barcode, this process was fairly straightforward.

However, the timing of the user training is vitally important. The users should be trained well in advance of the implementation, and immediately prior to the implementation. The reason for this is so the users can grasp the concept of reading the barcodes before they are implemented and have that knowledge reinforced immediately prior to implementation. This strategy should help minimise confusion during the changing of barcodes.

For Nolan Meats it was also important to train the users in the new system of internal coding as well. The operators who enter these codes when weighing cartons were given laminated sheets

as reference and learning material for when the new system was to be implemented. The operators were given these cards about 3 working days prior to the implementation.

3.3 Implementation

3.3.1 Installation of Carton Loadout Software

The installation of the carton scanning software is the first logical step of the implementation process. The theory is you should be able to scan the GS1•UCC barcodes before you produce them. A high priority for the scanning software at Nolan Meats is that it be compatible with both the GS1•UCC barcodes and our existing barcodes. This is due to the fact we could still have up to 25,000 cartons in storage.

The actual implementation was a simple process, with the program on the scanners being replaced. Rigorous testing of both GS1•UCC barcodes and SASTEK™ barcodes were performed to check the program's functionality and correct any programming errors which may be present.

3.3.2 Installation of Slaughter Floor Software

Nolan Meats have previously implemented GS1•UCC Carcass tickets to comply with the MSA grading system and other customer requirements. After review of the carcass ticket is was noted that barcode did not meet with the guidelines for the Australian Meat Industry. An example of the ticket is shown below.

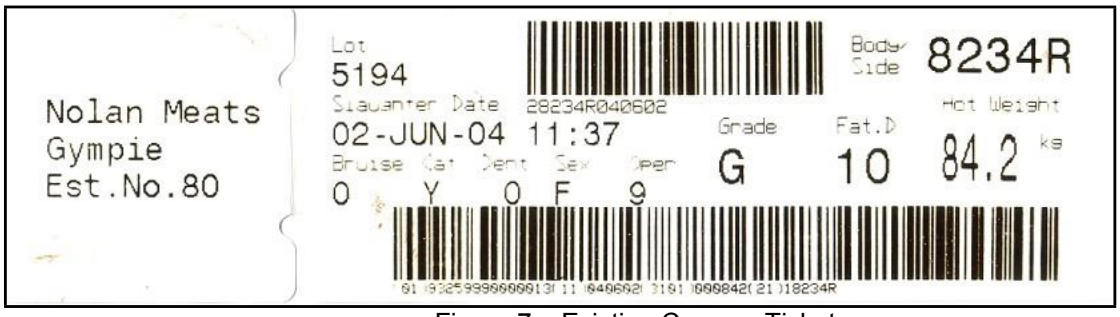


Figure 7 – Existing Carcass Ticket

After careful inspection it can be noted that the AI's 11 and 3101 are in the wrong order. It can also be noted that the AI 01 does not have another leading 9 to signify a variable measure trade item. Variable measure means that the weight varies for the same product. Eg two similar carcasses will not weigh the same.

After consultation with our software provider, the format of the ticket was corrected. The MSA system now had to be tested to make sure that they would scan the new format correctly. After trials, it was found that no setup changes were needed to the MSA software to scan the new tickets. An example of the corrected ticket may be seen below.

Figure 8 – Application of Carcass Ticket

Figure 9 – Updated Carcass Ticket

3.3.3 Test Carton Weight Software

Nolan Meats previously had propriety barcodes attached to all carton products exiting the boning room. An example of one of these barcodes is shown below.

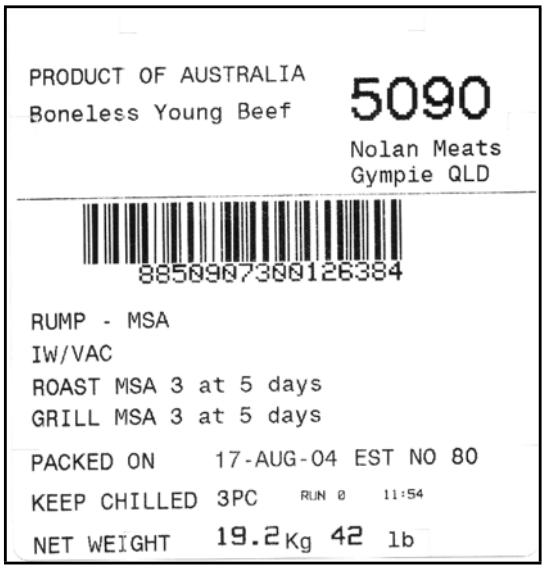


Figure 10 – Example Carton Label
(Note: Label is for demonstration purposes only)

This barcode is difficult to interpret and is far less documented than the standardised GS1•UCC barcode. Interpreting the SASTEK™ barcode is difficult with the structure of the barcode broken up as: XX-XXXX-XXX-XXXX-XXX. The first two characters represent the establishment. The next four represent the product code. The next three represent the date in Julian format, with the number being the number of days since the first of January that year. (The number starts at 500 for and even year). The next four is the serial number and the final three is the weight multiplied by 20. Compared to the GS1•UCC format which is structured: GS1 company and product, weight in KG with the number of decimal places denoted, date in YY-MM-DD format, and the serial number, with each separated by the application identifiers.

With the introduction of the GS1 barcodes, the process of deciphering the information is much easier. This not only is the case for staff at Nolan Meats who have to read it, but anyone around the world can interpret the information due to the world wide GS1•UCC standard.

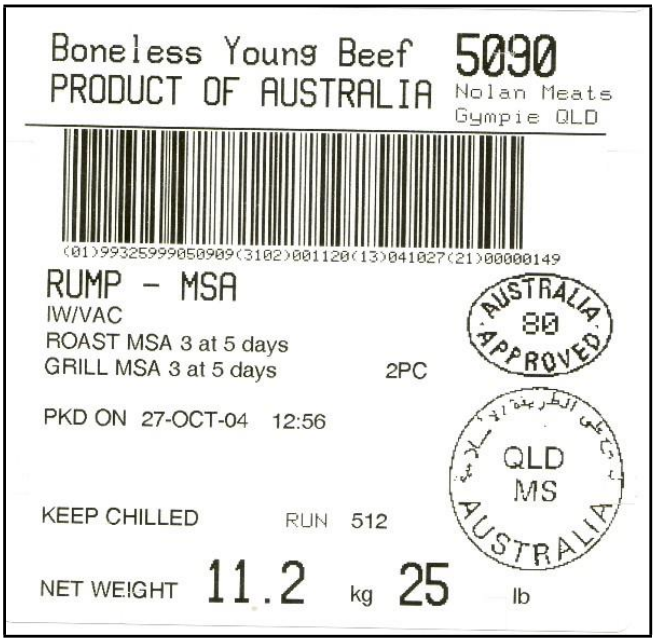


Figure 11 – Example GS1 Carton Label
(Note: Label is for demonstration purposes only)

As part of the implementation process, thorough testing of the new labels was undertaken. Primarily the main concern was the ability to scan the GS1•UCC barcodes at the same speed as previous Barcodes. This concern was due to the fact that the propriety barcodes have sixteen numbers in the barcode and the GS1•UCC barcodes have forty four. With today's generation barcode scanners, this should not be a problem, but we were trying to fit all that information into the same sized label.

The trouble with condensing a barcode is that the lines on the barcode are much finer. A problem that arises from this is that the barcode scanner must be held much closer in order to read the barcode. Also with finer lines, barcodes are much more susceptible to "smudging" where the limited resolution of the printer can cause unclear barcodes making them unreadable by barcode scanners.

After printing numerous test labels and fine tuning the speed and heat controls on the printer, we were able to achieve a barcode which scans in the same time as our existing barcodes and fits on the same sized media.

Figure 12 – Scanning a Carton Barcode

3.3.4 Modify Printer Cabinet

Our previous printers were mounted in stainless steel cabinets to keep the printer separated from the production area. The cabinets were custom built to suit our old Intermec Printers. With the introduction of the GS1•UCC capable Datamax® printers, it was obvious that they would not fit because they were physically larger. Hence the existing cabinets needed to be modified to fit the new printers.

Due to the nature of operations at Nolan Meats this work could only be conducted on the weekend without causing major disruptions. This meant that GS1•UCC barcodes could only be introduced on a Monday morning. Hence the relevant users had to be trained on the new system before the weekend.

Figure 13 – Datamax Printer Operating in Cabinet

3.3.5 Printer & Carton Weigh Installation

The actual installation and use of the new system was a relatively easy process, due to the work conducted over the previous week including, user training, label design, internal code setup and testing the scanning of barcodes.

Of course with any new system there were some minor teething problems, but as a whole the transition was a success.

3.4 Post Implementation

Review

After the successful implementation of the GS1•UCC printers and labels, it was imperative that review checks were conducted. This way we could assess the effectiveness of the implementation are compare it to our expected results.

This stage was also vital for some final fine tuning of the printers and barcode resolution to give the clearest and easiest barcode to scan. During this stage we were able to increase the printer's print speed by 1 inch per second (IPS) while still keeping a high resolution on the barcode.

4 Stage 3 – Electronic Messaging

4.1 Implementation Overview

The successful implementation of GS1 barcode technology throughout the supply chain at Nolan Meats, has laid the essential groundwork for the implementation of GS1COM® electronic messaging. GS1COM® is a derivative of the world standard UN/EDIFACT messaging syntax that has been adapted for the GS1 barcode system.

GS1COM® message types have been adapted to suit the needs of several industries, including the meat industry. For the purpose of the QeMEAT project, Nolan Meats will be implementing message types necessary for supply chain traceability. After evaluating the messaging systems and the requirements for supply chain traceability the following message types will be implemented.

Despatch Advice Message – Used for eDEC (Electronic Version of the National Vendor Declaration) and eMTC (Electronic Version of the Meat Transfer Certificate)

Receiving Advice Message – Used for the Reply messages for eDEC and eMTC

Each of these message types has been adapted to suit the individual system's requirements. This is due to fields unique to both NVD's and MTC's. However the underlying structure of the GS1COM® message has been preserved and the message identifies to which system it belongs right at the beginning of the message.

To best demonstrate the rationale for implementing an electronic system, a thorough analysis of the existing paper system should therefore be undertaken.
A diagram of the manual paper based system in use at Nolan Meats is shown below in figure 11.

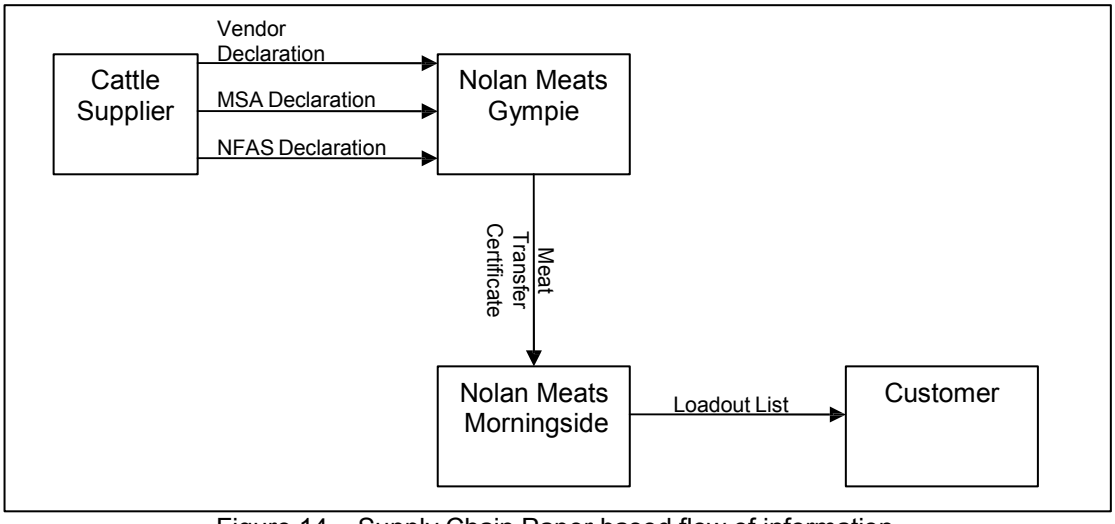


Figure 14 – Supply Chain Paper based flow of information

The current paper based system can be described as slow and tedious (when compared to an electronic system). This is due to the amount of double data entry which is required for Nolan Meats system. An example of double data entry at Nolan Meats, is when data is entered at the time of the cattle dispatch and secondly when it is entered into the system at the office. The

electronic system will eliminate the need for double data entry and can significantly reduce the time needed for trace backs with fast electronic searches.

With the implementation of the electronic messaging system at Nolan Meats, flow of information will be much faster, allowing for data to be sent ahead of the load and eliminate the need for duplicate data entry throughout the supply chain. With the elimination of duplicate data entry, it will also eliminate the chance of data being entered incorrectly the second time, whether it is a typing error or a misinterpretation of illegible hand writing on a paper form. This in turn will lead to more comprehensive and efficient traceability through electronic searches. Where it may have taken hours, even days to trace product back through the supply chain, the new system could potentially slash search times to just a few minutes or even less.

The electronic flow of messages has been designed to provide an initial data message to be sent with the dispatched product and a reply message from the consignee to acknowledge the successful receipt of the product. Using this approach, the electronic messaging structure to be used by Nolan Meats is shown in figure 12 below:

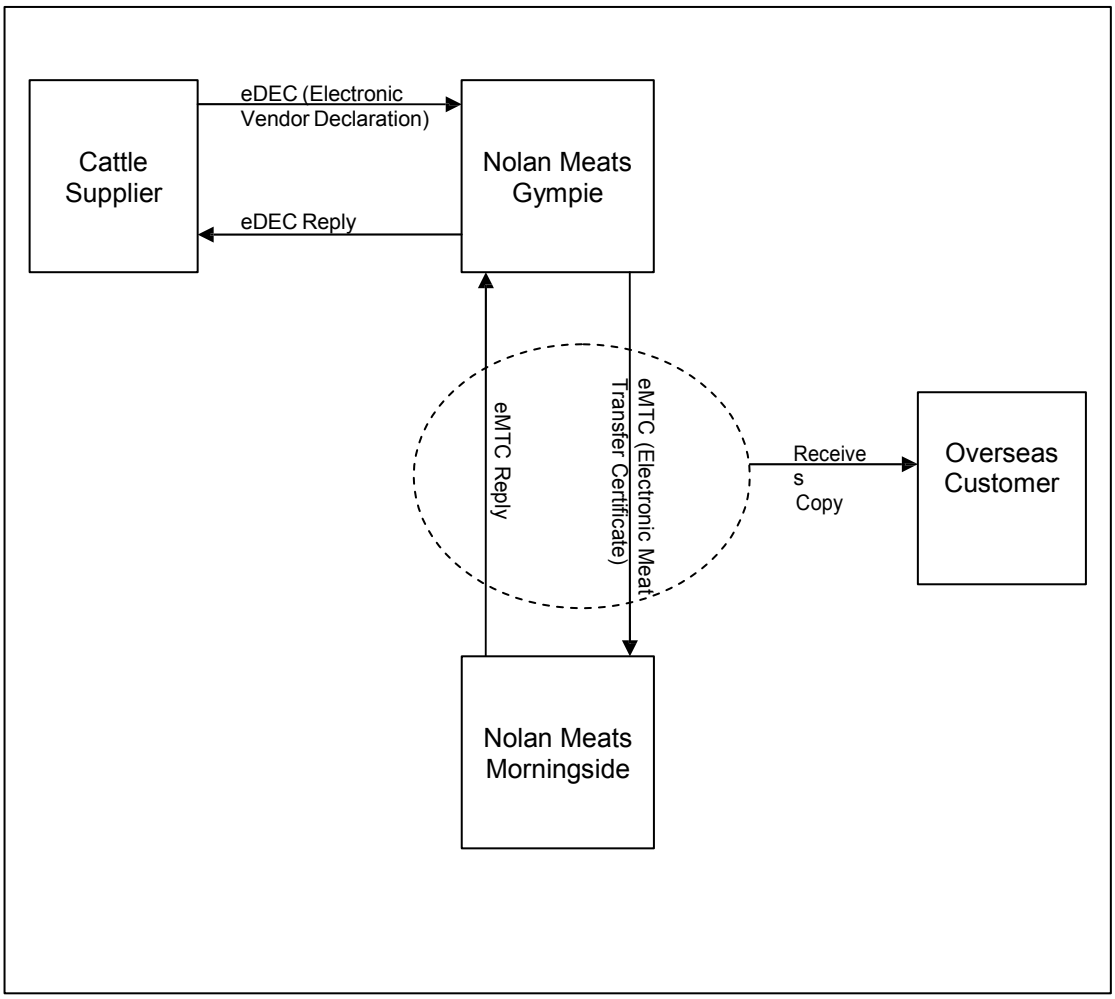


Figure 15 – Supply chain flow of electronic messages

Essential to the success of the electronic messaging system is the standardised format of the messages sent throughout the supply chain. The rationale for the standard message type is so any system/software can communicate successfully between each other. It is generally understood that all points throughout the supply chain may utilise different software systems

which will best suit their needs. As a general rule, these systems would be customised to the needs of the businesses and transfer of data between these systems would either be non existent or archaic at best. With the introduction of standard message types between systems, software vendors/system developers need only implement one type of data transfer system. The GS1COM® message structure elegantly handles the transfer of data between systems in a world recognised standard. In the previous implementation report, it was stated that to successfully implement the system, consultation with other members of the supply chain was essential. However the adoption of the standard message formats by all points throughout the supply chain is the single most important factor. The only communication needed is to exchange communication details for sending electronic messages.

To allow seamless integration of the GS1COM® electronic messages at Nolan Meats, an automatic messaging tool is to be created. This tool will operate automatically in the background of one of Nolan Meats servers providing the following functionality. Firstly it will format the data from the Nolan Meats' database into the GS1COM® message structure and then email the message. Secondly it will extract the data from a received GS1COM® message and store that data directly to Nolan Meats database. To implement each of the electronic message systems, some minor changes will be made to Nolan Meats existing data systems to incorporate information required for the messages.

The end result of the project will be an electronic messaging system which integrates seamlessly with Nolan Meats existing data systems. This will ultimately improve product traceability, reduce operating costs, and open up new markets for Nolan Meats. It is envisioned that with the adoption of the technology by industry through the demonstration of the Qe-Meat project, it will help open up new markets for the Australian Beef Industry as a whole.

4.2 Implementation

4.2.1 System Overview

For Nolan Meats the implementation of electronic messaging created some unique challenges. This is because Nolan Meats' company structure is distributed over a large geographical area. To maintain autonomy in the system, Nolan Meats has in place an existing private data connection to each remote location. This data connection allows the remote locations access to the central database and email server located in Gympie. Nolan Meats head office also has an existing internet connection which has restricted access for security reasons. With this in mind, it would be preferable for the remote locations to access the internet through our existing network rather than spending extra capital on new internet connections at the remote locations.

Due to this fact, plus our existing data systems are already structured for centralised data storage, it was decided that a single tool, and location, be responsible for the sending and receiving of the electronic messages. This would work by having external locations sending data back to the database server and setting a flag indicating that data was ready for processing. The messaging tool would then format the data and forward the messages on to their intended recipients.

The advantages of this system include:

- Centralised management of data.
- No need for distributed locations to dial the Internet for the purpose of sending messages. (They would use existing internal private network connection to send data back to the main office.)
- If future changes were required, they need only be changed in the database server and the Electronic Messaging Tool. (It may also include minor changes to the affected location.)
- Security issues are much easier to handle with a single connection to the Internet.

A single Electronic Messaging Tool would be developed with the capability of formatting all types of messages required for the project. Each distributed site would utilise their individual electronic system, eg (Feedlot – eDEC, Gympie – eMTC and eDEC, Coldstore – eMTC), which would then send data back to the database server. The Electronic Messaging Tool would then access this data, format it to the correct GS1COM® message type and send it via email.

Electronic Messaging Tool Development

Design

The Electronic Messaging Tool was designed to be compatible with all types of messages to be used in the project. Since the project will include up to four different types of messages, the program was designed in modules with each message type being a separate module in the program. This has the advantage that if further message types needed to be implemented, a module would be developed for each of the message types and simply added to the Messaging tool. To demonstrate this, figure below shows modular structure of the Electronic Messaging Tool.

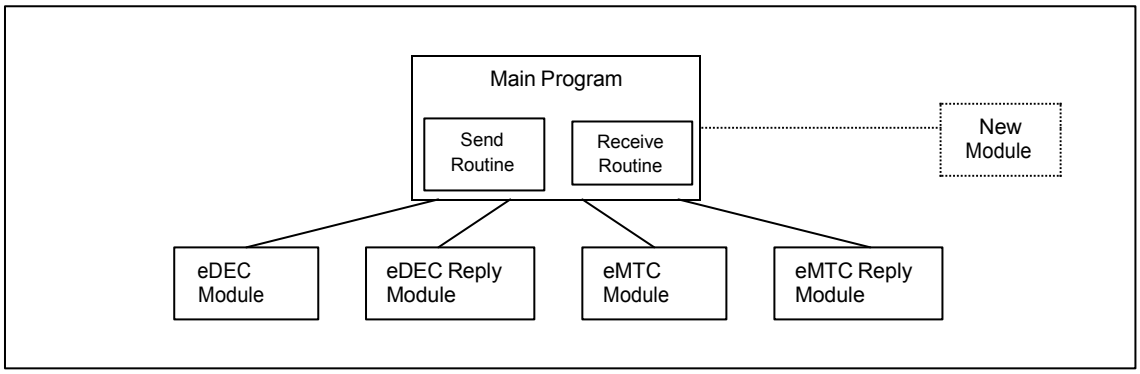
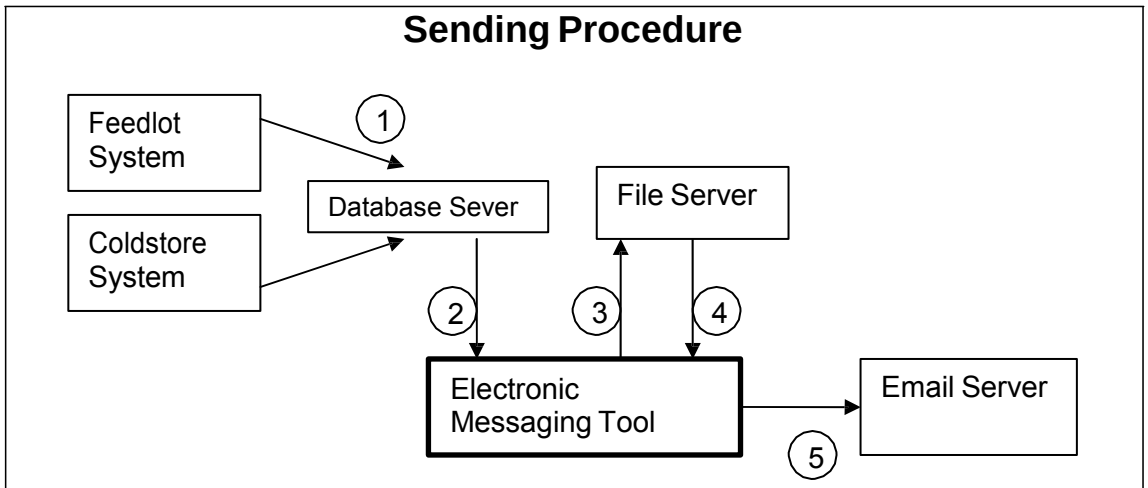


Figure 16 – Electronic Messaging Tool Modular Structure

The Electronic Messaging Tool functions in two distinct methods, sending GS1COM® messages and receiving GS1COM® messages. The two figures below give an overview of the sending and receiving functionality of the Electronic Messaging tool.



1. Data is collected and stored in tables in the Database Server
2. Electronic Messaging Tool obtains data from Database Server by periodically checking for data with a ready to send flag. Electronic Messaging Tool sets a flag that message has been sent.
3. Electronic Messaging Tool Formats message and saves to file server
4. Electronic Messaging Tool generates email message and attaches the file to the message.
5. Electronic Messaging Tool sends email to Email Server

Figure 17 – Electronic Messaging Tool Sending Procedure

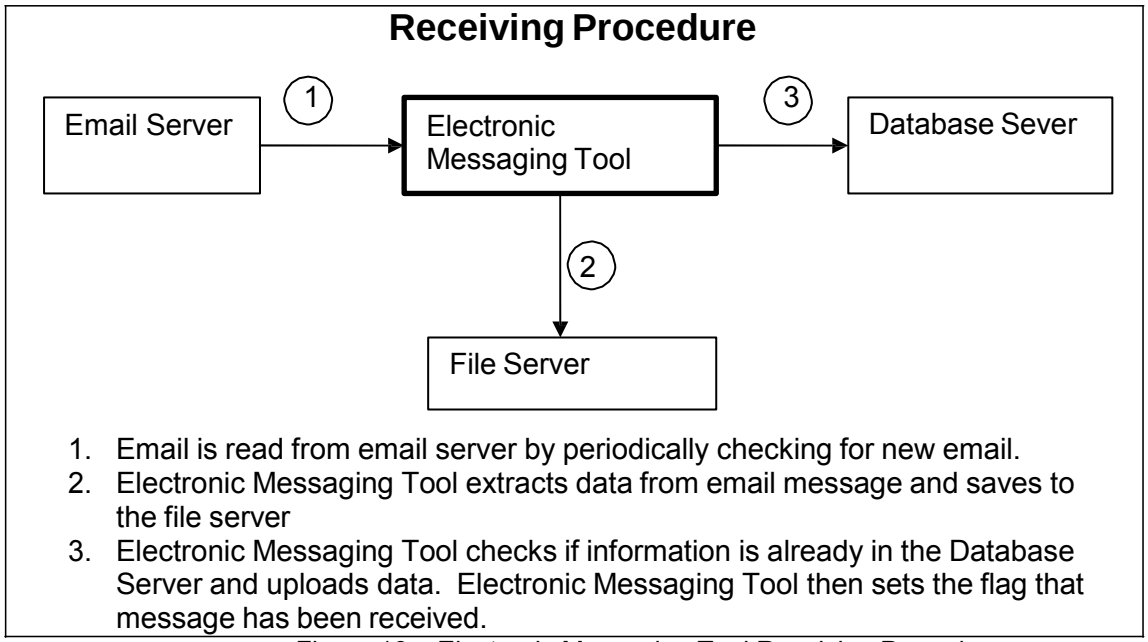


Figure 18 – Electronic Messaging Tool Receiving Procedure

The Electronic Messaging Tool writes the messages to the file server to keep a copy of the original message and store it for archival purposes. This structure of storing the data on the database sever and the file server gives the system both redundancy and extra flexibility. Data on the database can be utilised for fast and powerful searches, plus the message stored on the file server allows end users to resend files if necessary or use external tools to view the information (eg eDEC print tool).

Development

The Electronic Messaging Tool was designed to be as user configurable as possible without loosing any of its "Set and forget" functionality. Hence the program was designed to run as an application in the System Tray of the computer.

Figure 19 – Electronic Messaging Tool in the System Tray

The Electronic Messaging Tool has been developed with Visual Basic .Net making it a flexible application that will run on any windows based computer which has the .Net Frameworks installed. After starting the program, it is configured by right clicking on the icon and selecting configure from the menu.

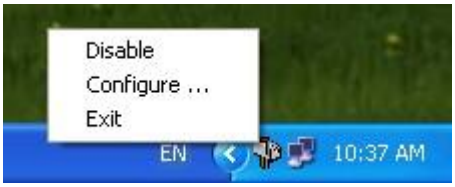


Figure 20 – Menu displayed when right clicked on Messaging Tool

After selecting “Configure …” on the menu, the following screen is displayed allowing the user to configure the application.

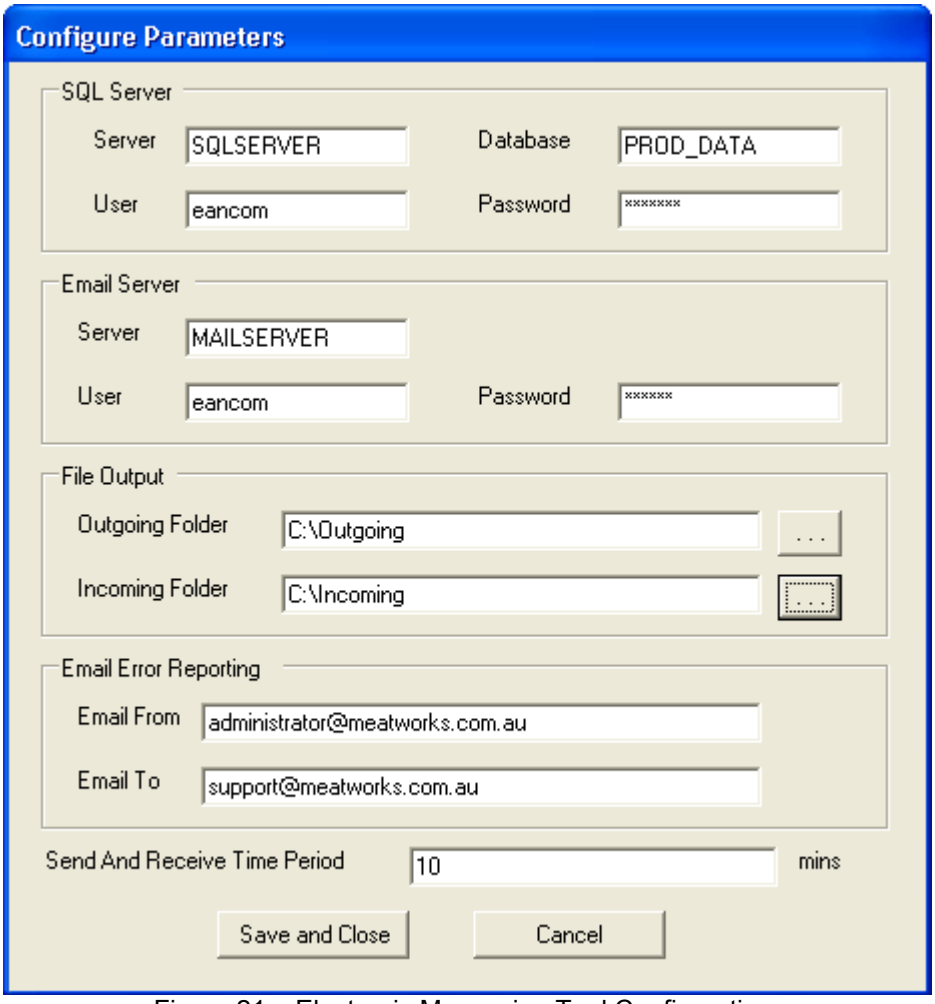


Figure 21 – Electronic Messaging Tool Configuration.

From the configure parameters screen, you can set all the necessary values for connecting to the database server and the email server. You can also set the directories that the GS1COM® formatted messages are stored and how often the program should check the email server to send and receive messages.

4.2.2 eDEC System

The eDEC system has been introduced as an electronic version of the National Vendor Declaration. Incorporated into the eDEC system is the paper versions of the National Vendor Declaration, MSA Declaration and NFAS Declaration. The potential benefit of the system is the ability to quickly reconcile cattle loads because the electronic message can contain individual cattle information. For example it can contain breed, age, sex and class for a mob of cattle and then for each animal their NLIS tag, weight and a serial number, eg visual ear tag. This has the potential for greatly reducing the information needed to be collected when cattle are received.

This would be achieved by reading the NLIS tag and linking to the information contained in the electronic message.

The implementation of the eDEC system at Nolan Meats was conducted as follows.

a) System evaluation

With consultation from Des Bowler (Management for Technology) the eDEC system was explored to utilise its full potential. With the eDEC system being released to the industry at the end of 2004, we evaluated the available eDEC application. After assessing its benefits and limitations, it was decided that Nolan Meats would develop its own solution. The main reason for this, was that a lot of information would have to be retyped using the industry available eDEC application. This unfortunately made the system counter productive as the time taken to do the declarations on the computer was much longer than manually writing them by hand. Also the system had no ability to integrate/access data from our existing system which could help speed up the process. By Nolan Meats developing its own tool, the system could be developed to access our existing data, plus it could also be integrated into a single universal messaging tool developed for the project.

The eDEC system structure is as follows:

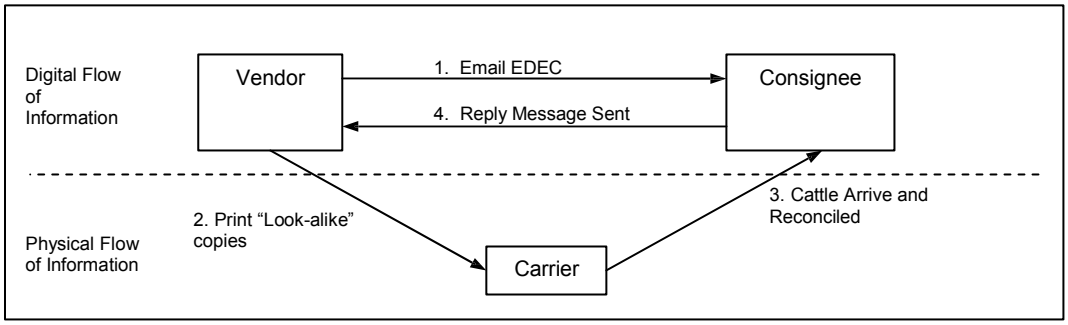


Figure 22 – eDEC System

1. The vendor completes the eDEC form and emails the eDEC to the consignee.
2. "Look-alike" Vendor Declaration forms are printed to accompany the load with the Carrier.
3. Consignee receives shipment and reconciles the load with the eDEC received ahead of shipment.
4. Consignee acknowledges successful receipt of load and emails reply to vendor.

b) Database changes

After thoroughly reviewing the requirements of the eDEC system and how best to integrate into our existing system, database changes were made. The changes included three new tables to store all the details contained in the eDEC messages. The first table created contains all the eDEC header details. This table contains information like, Name and Address details, and all the answers to the questions contained on the NVD, MSA and NFAS declarations. The second table created contains the detail header information like breed, class etc. The third table contains all the individual cattle details like RFID, Weight and Management Tag Numbers. The second and third tables were created to store individual cattle details from eDECs created by external cattle suppliers. eDECs created internally will have these details stored separately in existing tables.

Database changes were also made to incorporate the reply message structure. This consisted of a new table which housed (among other fields) the reply's serial number and reference field

which relates the reply message back to the original message. The reply messages will simply designate whether a load has been received without error.

c) "Look-alike" documents created

To comply with the requirements of the eDEC system, "Look-alike" documents still need to be generated to accompany the stock during transport. The "Look-alike" copies of the MSA, NVD, NFAS declarations and the ESI Table and Explanatory Notes were created. The system will now generate these documents once the eDEC has been completed. Note that these documents have a small code printed on the bottom right hand corner. This code denotes that the documents are approved system vendor developed documents. This code is obtained after the system has been approved for use by MLA (Meat and Livestock Australia).

NATIONAL VENDOR DECLARATION (CATTLE) AND WAYBILL - eDEC
First edition, November 2005
10004022
ORIGINAL - Purchaser (Receiver) Copy
This form cannot be used where eligibility for the EU market is required.

Part A To be completed by the owner or person who is responsible for the husbandry of the cattle.

Owner of cattle: NOLAN MEATS PTY LTD
Property/place where the journey commenced: WIDE BAY FEEDLOT
CINNABAR, QLD, 4600 0754841444 0754841266
Property Identification Code (PIC) of this property: QJKK0787 LPA Number: 400

Description of Cattle

Number	Description (BREED, SEX, E.G. HEREFORD CROSS STEERS AND BRANDS OR EARMARKS IF PRESENT OR REQUIRED)	PIC on Transaction Tag (IF DIFFERENT FROM THAT SHOWN ABOVE)
88	<50% bi eqs hfrs	

Consigned To: NOLAN MEATS PTY LTD, 88 EAST DEEP CREEK ROAD
GYMPIE, QLD, 4570 0754823188 0754821972
Destination (if different) of cattle:
NLIS devices used on these cattle: Number of ear tags 88 Number of rumen devices 0
Are all NLIS Identified cattle 'Lifetime Traceable'? Yes ☐ No ☑
Details of other statutory documents relating to this movement e.g. animal health certificate

DOCUMENT TYPE	NUMBER	OFFICE OF ISSUE	EXPIRY DATE

① Have any of the cattle in this consignment ever in their lives been treated with a hormonal growth promotant (HGP)? (Use a second document for mixed consignments.) Yes ☑ No ☐
② Have these cattle been raised consistent with the rules of an independently audited QA program on the property the PIC of which is shown above? Yes ☑ No ☐ If Yes, give details: NFAS 149
③ Has the owner stated above owned these cattle since their birth? Yes ☐ No ☑ If No, how long ago were the cattle obtained or purchased? (If purchased at different times, tick the box corresponding to the time of the most recent purchase.) A. Less than 2 months ☐ B. 2-6 months ☑ C. 6-12 months ☐ D. more than 12 months ☐
④ In the past 60 days, have any of these cattle been fed by-product stockfeeds? Yes ☐ No ☑ If Yes, attach a list of the byproduct stockfeeds, date when last fed and a copy of analyst's report if available.
⑤ In the past 6 months, have any of these cattle been on a property listed on the ERP database or placed under grazing restrictions because of chemical residue? Yes ☐ No ☑ If Yes, give details:

Paper NVD 1116838 Printed at QJKK0787 Print time 03/04/2006 04:03 PM Page 1 of 1

⑥ Are any of the cattle in this consignment still within a Withholding Period (WHP) or Export Slaughter Interval (ESI) following treatment with any veterinary drug or chemical? Yes ☐ No ☑ If Yes, give details: (Record additional details in question 9)

CHEMICAL PRODUCT	TREATMENT DATE	WHP	ESI(DAYS)

⑦ In the past 60 days, have any of these cattle consumed any stockfeed that was still within a WHP when harvested or first grazed? Yes ☐ No ☑ If Yes, give details:

CHEMICAL PRODUCT	DATE APPLIED	GRAZING WHP	GRAZING WHP	DATE FEEDING/GRAZING CEASE

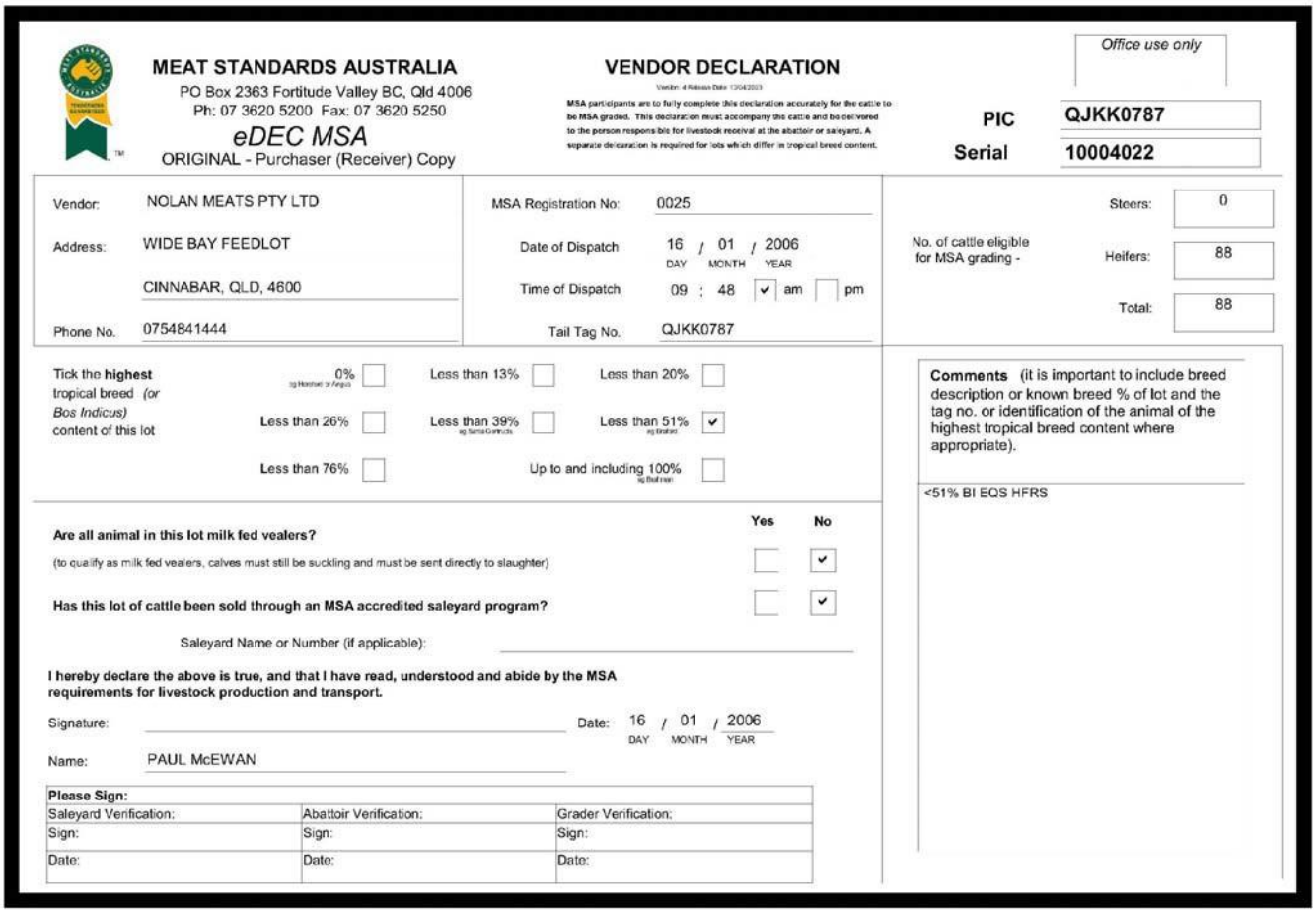
⑧ In the past 42 days, were any of these cattle:
a) grazed in an endosulfan spray risk area: or
b) fed fodders cut from an endosulfan spray drift risk area? (See Explanatory Notes for definition of endosulfan spray drift risk area.)
Yes ☐ No ☑ If Yes, Date Sprayed: / / (DAY / MONTH / YEAR)
⑨ Additional Information: see requirements in Explanatory Notes for completing this document.

Declaration
PAUL MCEWAN, NOLAN MEATS PTY LTD, WIDE BAY FEEDLOT, CINNABAR, QLD, 4600 (FULL NAME / ADDRESS)
declare that, I am the owner or the person responsible for the husbandry of the cattle and that all the information in Part A of this document is true and correct. I also declare that I have read and understood all the questions that I have answered, that I have read and understood the explanatory notes, and that, while under my control, the cattle were not fed restricted animal material including meat and bone meal) in breach of State or Territory legislation.
LPA
Signature* Date* 16 / 01 / 2006 (DAY / MONTH / YEAR)
*Only the person whose name appears above may sign this declaration, or make amendments which are to be initialled.
Tel No. 0754841444 Fax No.

Part B To be completed by the person in charge of the cattle while they are being moved. Completion of this part is optional in SA, TAS and VIC.
Movement commenced: 16 / 01 / 2006 (DAY / MONTH / YEAR) 09 : 48 AM
Vehicle registration number(s)*: 251-KRN
I PORTERS (FULL NAME) am the person in charge of the cattle during the movement and declare all information in Part B is true and correct.
Signature Date 16 / 01 / 2006 (DAY / MONTH / YEAR) Tel No.
*Where more than one truck is carrying the cattle, enter vehicle registration numbers and truck number.

Part C Agents Declaration for cattle sold at auction. (Completion of Part C is optional.)
Agents completing Part C should retain the original declaration for a minimum of two (2) years, or three (3) in WA and supply a copy to any buyer on request.
Vendor Code Agent's code
Stock agent company
Buyer's Name Destination PIC
No. of cattle purchased Saleyard arrival time (hh:m :)
Agent's signature Date / / (DAY / MONTH / YEAR)
SVCxxx060109

Figure 23 – NVD Consignee Copy "Look-alike"



MEAT STANDARDS AUSTRALIA
PO Box 2363 Fortitude Valley BC, Qld 4006
Ph: 07 3620 5200 Fax: 07 3620 5250
eDEC MSA
ORIGINAL - Purchaser (Receiver) Copy

VENDOR DECLARATION
MSA participants are to fully complete this declaration accurately for the cattle to be MSA graded. This declaration must accompany the cattle and be delivered to the person responsible for livestock receival at the abattoir or saleyard. A separate declaration is required for lots which differ in tropical breed content.

Office use only

PIC: QJKK0787
Serial: 10004022

Vendor: NOLAN MEATS PTY LTD
Address: WIDE BAY FEEDLOT
CINNABAR, QLD, 4600
Phone No. 0754841444

MSA Registration No: 0025
Date of Dispatch: 16 / 01 / 2006 (DAY / MONTH / YEAR)
Time of Dispatch: 09 : 48 ☑ am ☐ pm
Tail Tag No. QJKK0787

No. of cattle eligible for MSA grading -
Steers: 0
Heifers: 88
Total: 88

Tick the **highest** tropical breed *(or Bos Indicus)* content of this lot

0% (eg Hereford or Angus) ☐	Less than 13% ☐	Less than 20% ☐
Less than 26% ☐	Less than 39% (eg Santa Gertrudis) ☐	Less than 51% (eg Brahman) ☑
Less than 76% ☐	Up to and including 100% (eg Brahman) ☐	

Comments (it is important to include breed description or known breed % of lot and the tag no. or identification of the animal of the highest tropical breed content where appropriate).

<51% BI EQS HFRS

	Yes	No
Are all animal in this lot milk fed vealers? (to qualify as milk fed vealers, calves must still be suckling and must be sent directly to slaughter)	☐	☑
Has this lot of cattle been sold through an MSA accredited saleyard program?	☐	☑

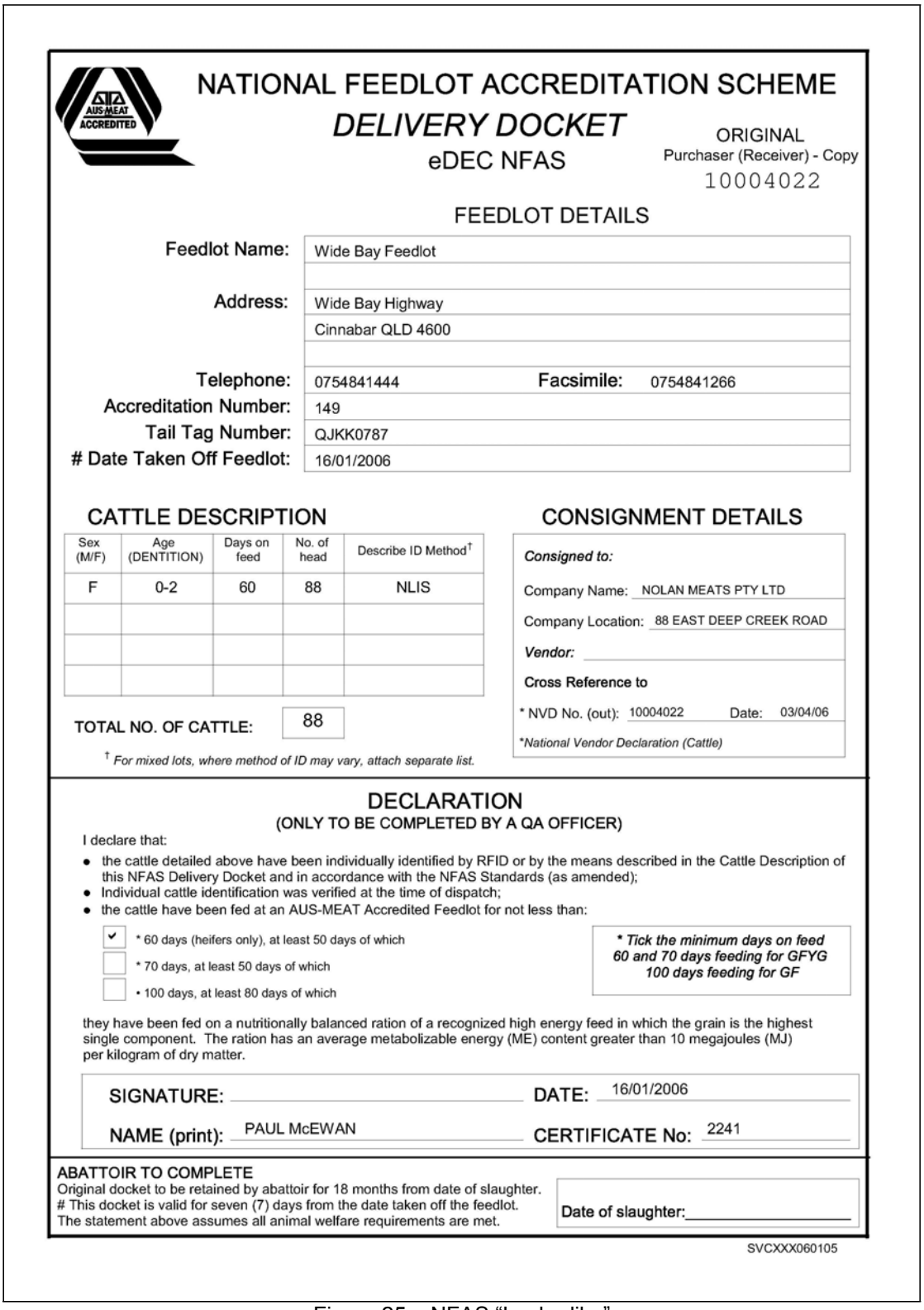
Saleyard Name or Number (if applicable):

I hereby declare the above is true, and that I have read, understood and abide by the MSA requirements for livestock production and transport.

Signature: Date: 16 / 01 / 2006 (DAY / MONTH / YEAR)
Name: PAUL McEWAN

Please Sign:		
Saleyard Verification:	Abattoir Verification:	Grader Verification:
Sign:	Sign:	Sign:
Date:	Date:	Date:

Figure 24 – MSA Declaration “Look-alike”



NATIONAL FEEDLOT ACCREDITATION SCHEME

DELIVERY DOCKET

eDEC NFAS

ORIGINAL
Purchaser (Receiver) - Copy

10004022

FEEDLOT DETAILS

Feedlot Name:	Wide Bay Feedlot
Address:	Wide Bay Highway Cinnabar QLD 4600
Telephone:	0754841444 Facsimile: 0754841266
Accreditation Number:	149
Tail Tag Number:	QJKK0787
# Date Taken Off Feedlot:	16/01/2006

CATTLE DESCRIPTION

Sex (M/F)	Age (DENTITION)	Days on feed	No. of head	Describe ID Method†
F	0-2	60	88	NLIS

TOTAL NO. OF CATTLE: 88

† *For mixed lots, where method of ID may vary, attach separate list.*

CONSIGNMENT DETAILS

Consigned to:

Company Name: NOLAN MEATS PTY LTD

Company Location: 88 EAST DEEP CREEK ROAD

Vendor:

Cross Reference to

* NVD No. (out): 10004022 Date: 03/04/06

**National Vendor Declaration (Cattle)*

DECLARATION

(ONLY TO BE COMPLETED BY A QA OFFICER)

I declare that:

- the cattle detailed above have been individually identified by RFID or by the means described in the Cattle Description of this NFAS Delivery Docket and in accordance with the NFAS Standards (as amended);
- Individual cattle identification was verified at the time of dispatch;
- the cattle have been fed at an AUS-MEAT Accredited Feedlot for not less than:

☑ * 60 days (heifers only), at least 50 days of which
☐ * 70 days, at least 50 days of which
☐ • 100 days, at least 80 days of which

** Tick the minimum days on feed 60 and 70 days feeding for GFYG 100 days feeding for GF*

they have been fed on a nutritionally balanced ration of a recognized high energy feed in which the grain is the highest single component. The ration has an average metabolizable energy (ME) content greater than 10 megajoules (MJ) per kilogram of dry matter.

SIGNATURE: _____ DATE: 16/01/2006

NAME (print): PAUL McEWAN CERTIFICATE No: 2241

ABATTOIR TO COMPLETE

Original docket to be retained by abattoir for 18 months from date of slaughter.
This docket is valid for seven (7) days from the date taken off the feedlot.
The statement above assumes all animal welfare requirements are met.

Date of slaughter:_____

SVCXXX060105

Figure 25 – NFAS "Look-alike"

d) Integrate eDEC into existing systems

After assessing the eDEC system, changes now had to be made to our existing data systems to integrate the eDEC system successfully. Nolan Meats had previously implemented an electronic movement system to record cattle movements at our feedlot in Cinnabar. The transition to

include eDEC requirements seemed a natural progression with only the new required fields for eDEC's to be added to the movement system.

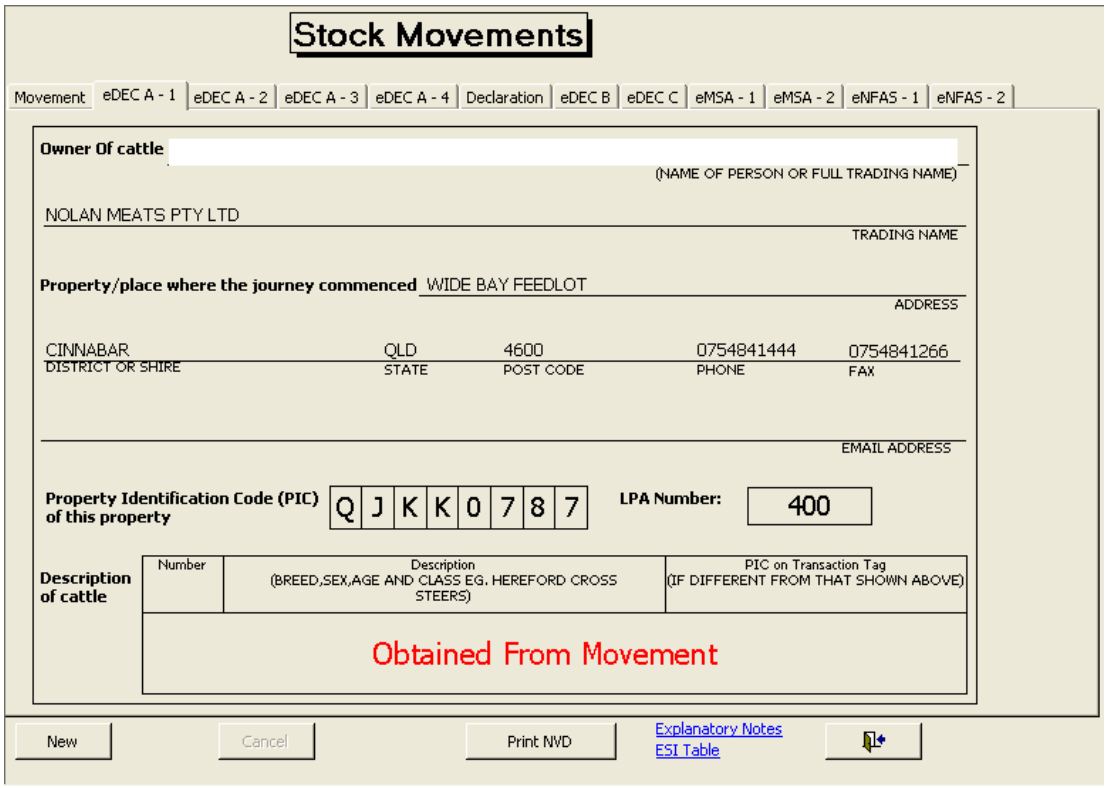


Figure 26 – eDEC Fields added to the Cattle Movement Screen

The eDEC system is now fully integrated into the Nolan Meats movement system. This has the added bonus that data can be extracted from our central database to populate the fields in the eDEC system. Also integrated is a validation system which will alert the user of incomplete required fields and will not allow an eDEC to be printed until all mandatory fields have been filled.

An Electronic Messaging Tool module was also developed to process eDEC and eDEC Reply messages. This module includes functions to recognise eDEC's, format and send eDEC's, and receive and extract data from eDEC messages.

e) User training

Most important of all was to convince the end users to accept the new system and to train them in using it. Some cattle team members have little experience with computer systems and the main objective of the training was to demonstrate how the system could save them time. The training process was made much easier because the users were already familiar with the movement system. By demonstrating that with minimal extra typing they could produce a NVD, assisted greatly in convincing the users to accept the system. After printing the NVD, it was explained that no further user interaction was required and the system would take care of the electronic messaging in the background.

Example Messages

Shown below is an example GS1COM® message generated for the eDEC system. This demonstrates how individual animal details can be contained within the message.

```
UNB+UNOA:3+0754823188:12+0754823188:12:+060403:1414+QJKK078710004022A+++++GS1COMMLA+0'
UNH+QJKK078710004022+DESADV:D:96A:UN:EAN005'
BGM+351::9:NVDBOVINE+QJKK078710004022+9'
DTM+137:20060201:102'
DTM+11:200512200000:203'
DTM+17:200512200000:203'
RFF+AAN:'
NAD+BY+9300000000000::9++NOLAN MEATS PTY LTD+88 EAST DEEP CREEK
ROAD+GYMPIE+QLD+4570+AU'
RFF+GN:'
CTA+TR+2345234523:'
COM+:EM'
COM+0754823188:TE'
COM+0754821972:FX'
NAD+SH+9300000000000::9++NOLAN MEATS PTY LTD+WIDE BAY FEEDLOT+CINNABAR+QLD+4600+AU'
RFF+GN:QJKK0787'
RFF+IA:400'
CTA+TR+23452435:'
COM+:EM'
COM+0754841444:TE'
COM+0754841266:FX'
NAD+DP+9300000000000::9+++++++AU'
RFF+GN:'
CTA+TR+23452345:'
COM+:EM'
COM+:TE'
COM+:FX'
NAD+UC+9300000000000::9++NOLAN MEATS PTY LTD+88 EAST DEEP CREEK
ROAD+GYMPIE+QLD+4570+AU'
RFF+GN:'
CTA+TR+2345243:'
COM+:EM'
COM+0754823188:TE'
COM+0754821972:FX'
NAD+SU+9300000000000::9++NOLAN MEATS PTY LTD+WIDE BAY FEEDLOT+CINNABAR+QLD+4600+AU'
RFF+GN:QJKK0787'
RFF+IA:400'
CTA+TR+23452435:'
COM+:EM'
COM+0754841444:TE'
COM+0754841266:FX'
COM+LPA@AUSMEAT.COM.AU:EM'
COM+LPA@MLA.COM.AU:EM'
TDT+20+1234567890+30+31+:::+SB++:::'
LOC+9+QJKK0787::60'
EQD+UL+'
MEA+PD+AAB:3+KGM:31055'
CPS+1++1E'
PAC+1'
HAN+EAT:::A1=0,A2=88,A3=0,A4=1'
HAN+EAT:::A5A=,A5B=,A5C=,A5D='
HAN+EAT:::B1=0,B2A=0,B2B=NFAS,B2C=149'
HAN+EAT:::B3A=1,B3B=1,B4=1,B5A=1,B5B='
HAN+EAT:::B6A=1,B6B='
HAN+EAT:::B6C=,B6D=,B6E='
HAN+EAT:::B7A=1,B7B='
HAN+EAT:::B7C=,B7D=,B7E=,B7F='
HAN+EAT:::B8A=1,B8B=,B8C=,B8D='
HAN+EAT:::B9='
CPS+2'
PAC+1'
HAN+EAT:::C1A=16,C1B=01,C1C=2006,C1D=0754841444'
HAN+EAT:::C2=PAUL McEWAN, NOLAN MEATS PTY LTD, WIDE BAY FEEDLOT, CINNABAR, QLD, 4600'
HAN+EAT:::D1A=16,D1B=01,D1C=2006,D2A=09,D2B=48,D2C=AM'
HAN+EAT:::D3='
HAN+EAT:::D4=251-KRN'
HAN+EAT:::D5=PORTERS'
HAN+EAT:::D6A=16,D6B=01,D6C=2006,D7='
HAN+EAT:::E1=,E2='
HAN+EAT:::E3='
HAN+EAT:::E4=,E5='
HAN+EAT:::E6=,E7A=,E7B=,E8A='
```

```
HAN+EAT:::E8B=,E8C='
CPS+3'
HAN+EAT:::MSA DATA'
HAN+EAT:::M1=0025,M2A=16,M2B=01,M2C=2006,M2D=09,M2E=48,M2F=1'
HAN+EAT:::M3=QJKK0787,M4=51,M5=1,M6=1'
HAN+EAT:::M7=PAULMcEWAN,M8A=16,M8B=01,M8C=2006'
HAN+EAT:::M9=0,M10=88,M11=88'
HAN+EAT:::M12=<51% BI EQS HFRS,M13='
CPS+4'
HAN+EAT:::NFAS DATA'
HAN+EAT:::N1=Wide Bay Feedlot'
HAN+EAT:::N2A=Wide Bay Highway'
HAN+EAT:::N2B=Cinnabar QLD 4600'
HAN+EAT:::N2C='
HAN+EAT:::N3A=0754841444,N3B=0754841266'
HAN+EAT:::N4A=143,N4B=QJKK0787,N4C=20060116' HAN+EAT:::N5A=F,N5B=0-
2,N5C=60,N5D=88,N5E=NLIS' HAN+EAT:::N6A=,N6B=,N6C=,N6D=,N6E='
HAN+EAT:::N7A=,N7B=,N7C=,N7D=,N7E='
CPS+5'
HAN+EAT:::N8A=,N8B=,N8C=,N8D=,N8E='
HAN+EAT:::N9A=1,N9B=0,N9C=0'
HAN+EAT:::N10=20060116,N11=PAUL     McEWAN,N12=2241'
HAN+EAT:::N13=10004022,N14=A,N15='
CPS+6'
HAN+EAT:::SENDER COMMERICAL DATA-10LINES OF 70AN'
HAN+EAT:::F1=,F2=,F3=,F4='
HAN+EAT:::F5=,F6=,F7=,F8='
CPS+2+1+3'
PAC+88++NE'
HAN+EAT:::LIVESTOCK'
LIN+1++99300000000000:EN'
PIA+1+:GD'
IMD+C+SPC+:::BOVINE'
IMD+C+BRE+:::'
IMD+C+SEX+:::'
IMD+C+AGE+:::'
IMD+C+CLS+:::Grain Fed Trade Cattle 200 - 280kg'
IMD+C+PIC+:::'
IMD+C+BRN+:::'
IMD+F++:::<50% bi eqs hfrs'
MEA+PD+AAB+KGM:31055'
QTY+12:88'
ALI+AU'
PCI+IEN+982    000035503724:3100000273210000000043138'
PCI+IEN+982    000035503447:3100000321210000000043167'
PCI+IEN+982    000033053378:3100000327210000000041747'
PCI+IEN+982    000034890942:3100000355210000000043065'
PCI+IEN+982    000043510507:3100000320210000000042584'
PCI+IEN+982    000038327363:3100000350210000000043042'
PCI+IEN+982    000040945536:3100000411210000000043152'
PCI+IEN+982    000038880523:3100000320210000000043178'
PCI+IEN+982    000030369651:3100000340210000000043168'
PCI+IEN+982    000041082021:3100000327210000000042906'
PCI+IEN+982    000034890707:3100000428210000000043115'
PCI+IEN+982    000035503612:3100000330210000000043229'
PCI+IEN+982    000041944912:3100000294210000000043225'
PCI+IEN+951    000005021809:3100000340210000000043006'
PCI+IEN+982    000038053090:3100000358210000000042864'
PCI+IEN+982    000034891067:3100000395210000000043228'
PCI+IEN+982    000035109372:3100000290210000000042985'
PCI+IEN+951    000005611694:3100000314210000000043048'
PCI+IEN+982    000035400412:3100000356210000000043164'
PCI+IEN+982    000038007888:3100000368210000000043200'
PCI+IEN+951    000002677569:3100000311210000000043034'
PCI+IEN+982    000041945281:3100000281210000000043142'
PCI+IEN+982    000040498121:3100000340210000000043004'
PCI+IEN+982    000041944326:3100000309210000000043056'
PCI+IEN+982    000040831123:3100000430210000000043128'
PCI+IEN+951    000002961169:3100000340210000000042919'
PCI+IEN+982    000041944985:3100000273210000000043209'
PCI+IEN+982    000036022530:3100000355210000000043189'
```

```
PCI+IEN+982    000038881040:3100000332210000000043157'
PCI+IEN+982    000043743418:3100000295210000000043110'
PCI+IEN+982    000042968147:3100000357210000000043107'
PCI+IEN+982    000038904649:3100000360210000000043154'
PCI+IEN+951    000002676413:3100000280210000000043036'
PCI+IEN+982    000035399685:3100000385210000000043201'
PCI+IEN+982    000034890827:3100000383210000000043238'
PCI+IEN+951    000002018753:3100000321210000000041724'
PCI+IEN+982    000038880664:3100000370210000000043146'
PCI+IEN+982    000040958550:3100000335210000000043104'
PCI+IEN+982    000032269503:3100000350210000000042895'
PCI+IEN+982    000041944954:3100000292210000000043174'
PCI+IEN+982    000041945064:3100000293210000000043101'
PCI+IEN+982    000034890319:3100000350210000000043149'
PCI+IEN+982    000037560571:3100000401210000000043162'
PCI+IEN+982    000034738027:3100000326210000000043027'
PCI+IEN+982    000038769146:3100000439210000000043135'
PCI+IEN+982    000041945179:3100000419210000000043118'
PCI+IEN+982    000037607872:3100000300210000000043019'
PCI+IEN+982    000034890789:3100000479210000000043190'
PCI+IEN+951    000005611876:3100000355210000000042988'
PCI+IEN+982    000038182585:3100000342210000000043160'
PCI+IEN+982    000039156394:3100000335210000000043150'
PCI+IEN+982    000040498402:3100000368210000000043026'
PCI+IEN+982    000038115516:3100000385210000000043086'
PCI+IEN+982    000041081992:3100000420210000000042909'
PCI+IEN+982    000034735178:3100000303210000000043014'
PCI+IEN+982    000041944903:3100000316210000000043169'
PCI+IEN+982    000035399843:3100000380210000000043057'
PCI+IEN+982    000039138701:3100000347210000000042851'
PCI+IEN+982    000037118713:3100000379210000000043240'
PCI+IEN+982    000034237527:3100000358210000000041814'
PCI+IEN+982    000035109711:3100000396210000000043053'
PCI+IEN+982    000029475259:3100000434210000000042957'
PCI+IEN+982    000034890851:3100000393210000000043058'
PCI+IEN+982    000034737195:3100000336210000000043018'
PCI+IEN+982    000041563786:3100000333210000000043069'
PCI+IEN+982    000039156560:3100000454210000000043173'
PCI+IEN+982    000038880485:3100000342210000000043151'
PCI+IEN+951    000002677191:3100000322210000000043021'
PCI+IEN+982    000041614755:3100000409210000000043114'
PCI+IEN+982    000038880429:3100000301210000000043239'
PCI+IEN+982    000034890815:3100000419210000000043234'
PCI+IEN+982    000037560331:3100000400210000000043094'
PCI+IEN+982    000038769326:3100000342210000000043113'
PCI+IEN+982    000041944828:3100000300210000000043068'
PCI+IEN+951    000004639374:3100000353210000000041438'
PCI+IEN+982    000040963808:3100000534210000000043090'
PCI+IEN+982    000034726215:3100000321210000000042997'
PCI+IEN+982    000038008046:3100000379210000000043217'
PCI+IEN+982    000032348311:3100000403210000000042926'
PCI+IEN+982    000041945122:3100000317210000000043095'
PCI+IEN+982    000032282649:3100000324210000000042016'
PCI+IEN+951    000004641427:3100000336210000000041474'
PCI+IEN+982    000033925224:3100000321210000000041946'
PCI+IEN+951    000004639995:3100000345210000000041460'
PCI+IEN+982    000038115578:3100000374210000000043182'
PCI+IEN+951    000002957997:3100000341210000000042975'
PCI+IEN+982    000034296155:3100000327210000000041854'
PCI+IEN+982    000035400232:3100000388210000000043203'
CNT+2:1'
UNT+203+QJKK078710004022'
UNZ+1+QJKK078710004022A'
```

4.2.3 eMTC System

The eMTC (Electronic Meat Transfer Certificate) system was designed to replace the manual paper version of the MTC. The electronic version of the system has some distinct advantages

over the paper based system. Not only does the electronic version contain all the information contained in the paper based version, it also contains a complete barcode of every carton contained in the load. The new electronic version also contains an electronic signature which helps prevent fraudulent documents being created. Also, the message can be sent ahead of the load with the ability for each carton in the load to be reconciled on receipt.

The electronic meat transfer certificate system has been designed with the following structure:

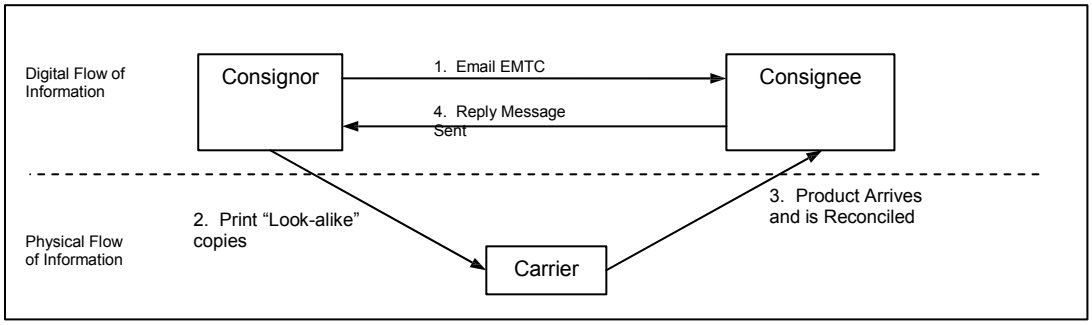


Figure 27 – eMTC system

1. After loading the product, the Consignor generates the eMTC message which is emailed to the Consignee.
2. "Look-alike" Meat Transfer Certificates are generated and accompany the load
3. Consignee receives shipment and reconciles the load with the eMTC received ahead of shipment.
4. Consignee acknowledges successful receipt of load and emails reply to consignor.

a) System Evaluation

The electronic meat transfer system has the potential to be quite beneficial for Nolan Meats. This is because all carton meat produced at the Gympie facility is sent to our carton storage and distribution centre in Morningside, Brisbane. With the current manual paper system each truck load sent from Gympie to Morningside has to have a paper MTC filled out. This can be quite time intensive and time which could be put to more effective use elsewhere. The introduction of the electronic version of the certificate would significantly reduce the time needed for filling out the paper work, due to most of the information already contained in the computer. The electronic Meat Transfer Certificate will integrate well into Nolan Meats carton movement system.

The carton movement system already tracks individual carton details, origin and destination, truck number plates and departure and arrival dates. For the system to produce electronic meat transfer certificates, only minor modifications were needed, more specifically, a few extra fields required by the eMTC system need to be added to the existing movement system.

b) Database Changes

After reviewing the requirements of the eMTC system and how best to integrate into our existing system, database changes were made. These changes included three new tables to store all the details contained in the eMTC messages. The first table created contains all the eMTC header details. This table contains information like, Name and Address details and transportation details. The second table created contains the product header details and the third table contains the individual barcodes of all the cartons covered by the certificate. These other two tables were created to store carton details from eMTCs created by external suppliers. eMTCs created internally will have these details stored separately in existing movement tables.
Database changes were also made to incorporate the reply message structure. This included the addition of another table to the database to store (among other details) the reply's serial

number and the reference field, which designates to which message the reply corresponds to. The database changes were structured so searches for completed MTC's and unreconciled MTC's could be found quickly. This was achieved by creating a field signifying whether a MTC was received without error.

c) "Look-alike" Documents Created

Original - Consigned To Copy Page 1 of 1

Department of Agriculture, Fisheries and Forestry

MEAT Transfer Certificate

SSCC 993259990000049156
Date 20060421

Paper MTC Number (If Applicable) 2295055

Description Of Cosignment

S/L Est's	S/L Dates	Product Description (chilled c/c's mutton, hard frozen ctns beef hearts).	Number and Kinds of packages or carcases			Identification marks for specific markets	Production Est's	Production Dates
80	20060221 - 20060222	Blade GFYG	5	Cartons	91.3 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Chuck Tender GFYG	6	Cartons	108.9 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Inside GFYG	49	Cartons	887.6 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Brisket Rolled GFYG	12	Cartons	169.1 KGS	AA80	80	20060222 - 20060223
80	20060222 - 20060222	Outside Under 7 kg GFYG	16	Cartons	266.8 KGS	AA80	80	20060223 - 20060223
80	20060221 - 20060222	Outside 7 kg and Over GFYG	38	Cartons	589.2 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Heel Muscle GFYG	9	Cartons	192.6 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Shin/Shank GFYG	14	Cartons	288.3 KGS	AA80	80	20060222 - 20060223
80	20060222 - 20060222	Short Loin Under 7kg GFYG	7	Cartons	109.8 KGS	AA80	80	20060223 - 20060223
80	20060222 - 20060222	Short Loin 7 kg and Over GFYG	23	Cartons	378.6 KGS	AA80	80	20060223 - 20060223
80	20060222 - 20060222	Butt Tenderloin GFYG	2	Cartons	33.2 KGS	AA80	80	20060223 - 20060223
80	20060221 - 20060222	Knuckle GFYG	18	Cartons	368.4 KGS	AA80	80	20060222 - 20060223
80	20060221 - 20060222	Thin Flank Pieces GFYG	7	Cartons	115.6 KGS	AA80	80	20060222 - 20060223
80	20060222 - 20060222	Flank Steak GFYG	2	Cartons	38.9 KGS	AA80	80	20060223 - 20060223
80	20060221 - 20060222	Chuck GFYG	51	Cartons	939.4 KGS	AA80	80	20060222 - 20060223
80	20060222 - 20060222	Rump GFYG	1	Cartons	21.8 KGS	AA80	80	20060223 - 20060223
80	20060221 - 20060222	Tritip GFYG	3	Cartons	56.7 KGS	AA80	80	20060222 - 20060223
80	20060222 - 20060222	Short Loin Under 7kg PS	8	Cartons	129.5 KGS	AA80	80	20060223 - 20060223
80	20060222 - 20060222	Short Loin 7 kg and Over PS	11	Cartons	165.0 KGS	AA80	80	20060223 - 20060223
80	20060221 - 20060221	Tendon Pieces Beef	1	Cartons	13.7 KGS	AA80	80	20060222 - 20060222
80	20060221 - 20060221	Trmg 70 Whizard Vac	1	Cartons	16.3 KGS	AA80	80	20060222 - 20060222
80	20060221 - 20060221	Trmg 70 Beef Vac	1	Cartons	14.3 KGS	AA80	80	20060222 - 20060222
80	20060221 - 20060222	Trmg 90 Beef Vac	99	Cartons	2167.5 KGS	AA80	80	20060222 - 20060223

Include details of market eligibility — Countries Accepting Tier 1 Halal Product

Journey Details

Consigned From (name and full street address of Est.)		Consigned To (name and full street address of Est.)	
Nolan Meats Pty Ltd **88 East Deep Creek Road** **Gympie, 4570, QLD**		**Nolan Meats Pty Ltd** **164 Riverside Place** **Morningside, 4170, QLD**	
Phone **0754823188**	Est. No **80**		Est. No **81**
Estimated time of Vehicle departure **23/02/06 02:04 PM**	Estimated travelling Time (Hours) **2**	Transport Company Name **Nolan Meats Pty Ltd**	
Vehicle and Trailer Numbers **NOL80**			

Owner/Agent Declaration

I as the owner or agent for the owner delare that the information provided above is true and correct and that the goods specified have been produced, stored and transported in accordance with orders made under the ***Export Control Act 1982.***

The seal numbers applied are:

The load was subjected to detailed inspection **No**

04963584	Tim Discher	eancom@nolan.local
Electronic Signature of Authorised Company Official	Name of Authorised Company Official	Email of Authorised Company Official

Attestation of Receiving Official

I certify that the product specified above was.

Received at: hours on / / in a satisfactory/ unsatifactory condition.

The load was subjected to detailed inspection Yes/No* / /

Signature of Receiving Official Printed Name

*Delete whichever inapplicable

SVCxxx050926

Figure 28 – "Look-alike" Meat Transfer Certificate

d) System Integration

After assessing the eMTC system, changes now had to be made to our existing data systems to integrate the eMTC system successfully. Nolan Meats had previously implemented an electronic movement system to record carton movements between our abattoir site in Gympie and our Coldstore facility in Morningside. The transition to include eMTC requirements seemed a natural progression with only the new required fields for eMTC's to be added to the movement system.

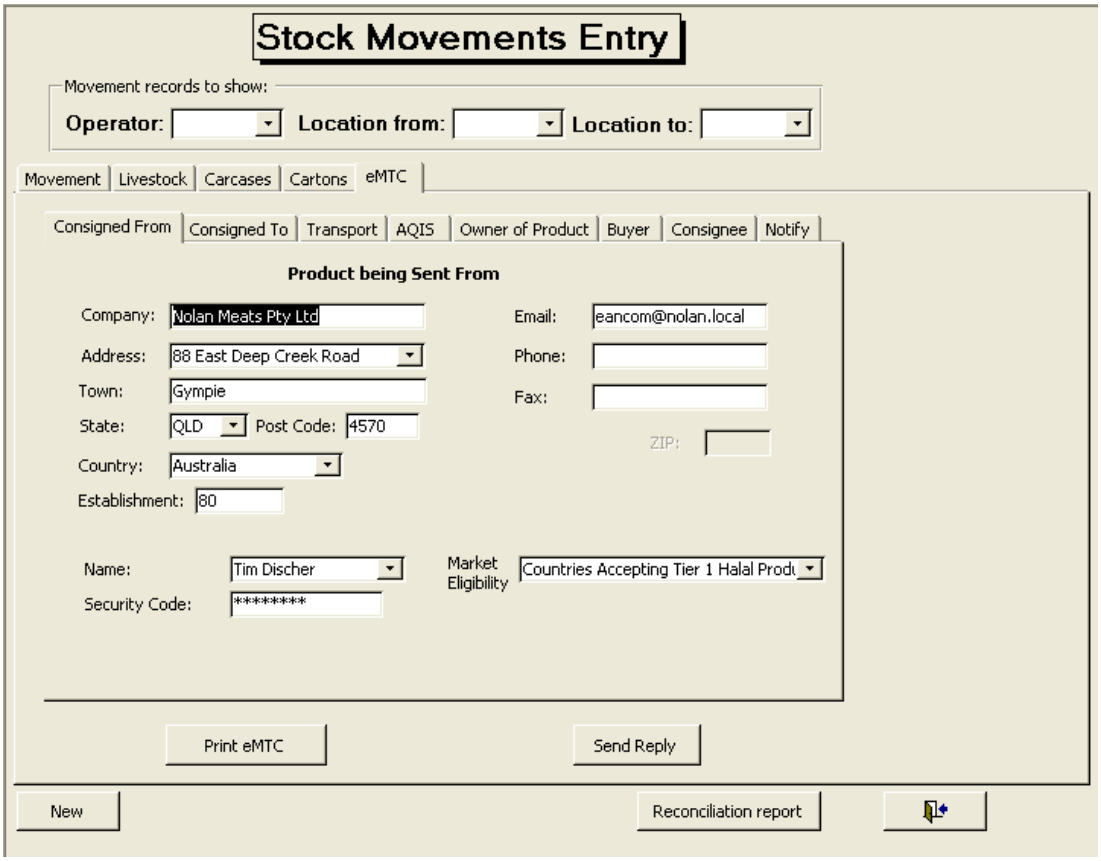


Figure 29 – eMTC Fields added to the Carton Movement System

The eMTC system is now fully integrated into the Nolan Meats movement system. This has the added bonus that data can be extracted from our central database to populate the fields in the eMTC system.

An Electronic Messaging Tool module was also developed to process eMTC and eMTC Reply messages. This module includes functions to recognise eMTC's, format and send eMTC's, and receive and extract data from eMTC messages.

e) User Training

The user training of the eMTC process was a relatively straight forward process. The employees responsible for the transfer of carton product between the Gympie facility and the Morningside Coldstore facility were already familiar with Nolan Meats carton movement system. The introduction of the electronic meat transfer certificate was widely welcomed because they saw the benefit of the system immediately. To generate a MTC, all that was required was a few more clicks of the mouse in the movement system and print the report.

The ease of acceptance of the Electronic meat transfer certificate can be directly attributed to the similarity of the movement system. Had this not been the case, the process of training the users

would have been more difficult due to a sea change required to use the computer instead of the paper based system. However, with careful development of the electronic meat transfer certificate system, the transition can be made with relative ease. Some steps to assist with the integration include; one step addition of product to the MTC using barcode scanning, removing actual data entry (typing) and using drop down boxes.

Example messages

Shown below is an example EANCOM® message generated for the eMTC system.

```
UNB+UNOA:3+80:12+81:12:+050927:094048+193259990000030806A+++++EANCOMMLA+0'
UNH+193259990000030806+DESADV:D:96A:UN:EAN005'
BGM+351::9:MTC+193259990000030806+9'
DTM+137:20050920:102'
DTM+11:200509201638:203'
DTM+17:200509201838:203'
RFF+AAE:'
RFF+BM:'
RFF+EX:'
RFF+GN:'
RFF+IV:'
DTM+3::102'
RFF+ON:'
DTM+4::102'
RFF+AAN:2213775'
NAD+BY+9312345000113::9+++++++
' RFF+API:'
CTA+PD+:
'
COM+:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+SH+9312345000113::9++Nolan Meats Pty Ltd+88 East Deep Creek Road+Gympie+QLD+4570+AU'
CTA+CN+:'
COM+eancom@nolan.local:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+DP+9312345000113::9++Nolan Meats Pty Ltd+164 Riverside Place+Morningside+QLD+4170+AU'
CTA+CN+:'
COM+eancom@nolan.local:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+NI+9312345000113::9+++++++'
RFF+API:'
CTA+NT+:'
COM+:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+CN+9312345000113::9+++++++'
RFF+API:'
CTA+PD+:
'
COM+:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+SU+9312345000113::9+++++++'
CTA+PD+:'
COM+:EM'
COM+:TE'
COM+:FX'
CTA+IC+:'
NAD+RA+9312345000113::9+++++++'
CTA+CM+:'
COM+:EM'
COM+:TE'
COM+:FX'
```

CTA+IC+:'

```
COM+LPA@AUSMEAT.COM.AU:EM'
COM+LPA@NLIS.COM.AU:EM'
TDT+20+1234567890+30+31+:::Nolan Meats Pty Ltd+SB++:::nol 30'
LOC+9+80:::Nolan Meats Pty Ltd, 88 East Deep Creek Road, Gympie, QLD, 4570, AU'
LOC+11+81:::Nolan Meats Pty Ltd, 164 Riverside Place, Morningside, QLD, 4170, AU'
LOC+36+::'
EQD++'
MEA+PD++KGM:'
SEL++CA'
SEL++SH'
SEL++CU'
SEL++DAFF'
SEL++IN'
CPS+1++1E'
PAC+1'
PCI+33E'
GIN+BJ+193259990000030806'
PCI+IEN+:::Countries Accepting Tier 1 Product'
RFF+AGB:'
CPS+2+1+3'
PAC+55++CT'
HAN+EAT:::KEEP CHILLED +1 DEGREES CELSIUS'
LIN+1++99325999024009:EN'
PIA+1+:GD'
IMD+E++:::BOVINE'
IMD+F++:::Blade  GFD'
IMD+C+ABO+:::80'
IMD+C+PRD+:::80'
IMD+C+POR+:::AA80'
MEA+PD+AAA+KGM+818.2'
QTY+12:48'
ALI+AU'
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PCI+IEN+0199325999024009:3102001520130509022100001101'
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DTM+324:20050901-20050901:718'
LIN+2++99325999024030:EN'
PIA+2+:GD'
IMD+E++:::BOVINE'
IMD+F++:::Blade Bolar GFD'
IMD+C+ABO+:::80'
IMD+C+PRD+:::80'
IMD+C+POR+:::AA80'
MEA+PD+AAA+KGM+7.3'
QTY+12:1'
ALI+AU'
PCI+IEN+0199325999024030:3102000730130509022100001653'
DTM+365:20050902-20050902:718'
DTM+324:20050901-20050901:718'
LIN+3++99325999024054:EN'
PIA+3+:GD'
IMD+E++:::BOVINE'
IMD+F++:::Chuck Tender GFD'
IMD+C+ABO+:::80'
IMD+C+PRD+:::80'
IMD+C+POR+:::AA80'
MEA+PD+AAA+KGM+101.1'
QTY+12:6'
ALI+AU'
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DTM+365:20050902-20050902:718'
DTM+324:20050901-20050901:718'
CNT+2:3'
UNT+102+193259990000030806'
UNZ+1+1932599900000030806A'
```

5 Stage 4 – Post Implementation Review

5.1 Overview

With the developmental stages of the project now completed, an evaluation of the performance of the changes is now to be conducted. Before we can do that, we must review exactly what has been implemented in the project.

Firstly, GS1 compliant barcodes were applied to our base level items of trade. This means every carton or carcass produced by Nolan Meats contains an GS1 compliant barcode. Secondly, GS1 compliant messages were created to complete supply chain traceability. In the project two types of electronic messages were created. These were the Electronic Vendor Declaration and the Electronic Meat Transfer Certificate.

When the project was initiated, it was envisioned that four different messaging systems were to be developed. This included: Electronic Vendor Declaration, Electronic Vendor Feedback, Electronic Meat Transfer Certificate and Electronic Consignment Information. For various reasons, including un-finalised messaging standards and time constraints, only two of these messaging systems were developed for the project. As it stands the development time for the two implemented messaging systems was constantly extended due to un-finalised messaging standards and waiting for approvals from the appropriate regulatory bodies. However, with these issues now out of the way, it paves the way for industry to adopt/develop their own implementations of the Electronic Vendor Declarations and Electronic Meat Transfer Certificate systems.

The review process was conducted only a few weeks after the implementation of the electronic messaging systems. This time was considered crucial, as it allowed time for all of the users to learn and become proficient in the system, while being close enough to the change over that the end users were still familiar with the old system. This allowed for an accurate comparison between the two systems and was not taking into effect the user's learning curve.

The measurements being recorded are only for the systems which were actually implemented throughout the project. The time and cost savings are indicative only and are subject to the user's training and proficiency in using the system.

5.2 Measurements of new system

Cattle Dispatch & Receiving
(for 100 head of cattle)

	Time Spent			$
Task	Without GS1	Projected With GS1	Actual With GS1	Saved
1. Record induction of cattle with weights, vendor's NVDs, market access and drugs used for individual animals	(100 × 40 sec) 67 Mins	(100 × 30 sec) 50 Mins	(100 × 30 sec) 50 Mins	$51
2. Produce waybill, NVD, MSA, NFAS Declarations. Records kept & filed for required period	20 Mins (per lot)	4 Mins (per lot)	5 Mins (per lot)	$15
3. Reconcile load and acknowledge receipt	10 Mins (per lot)	3 Mins (per lot)	5 Mins (per lot)	$5

Transferring Between Abattoir and Coldstore
(for 672 cartons)

	Associated Cost			$
Task	Without GS1	Projected With GS1	Actual With GS1	Saved
1. Scan cartons to truck from Abattoir	(672 × 0.12) $80.64	(672 × 0.12) $80.64	(672 × 0.12) $80.64	$0
2. Prepare MTC for Coldstore	$15	$0	$5	$10
3. Scan cartons into Coldstore	(672 × 0.12) $80.64	(672 × 0.12) $80.64	(672 × 0.12) $80.64	$0
4. Complete MTC and return to Abattoir	$15	$0	$0	$15
5. Reconcile MTC and File	$15	$0	$5	$10

5.3 Analysis of Results

Cattle Dispatch & Receiving

1. The largest time saving for inducting cattle has been the introduction of the NLIS scheme throughout Queensland. This has meant the feedlot no longer has to apply an electronic ear-tag to each animal inducted.
2. The time saving for generating the associated documentation was very significant. No longer did the feedlot have to hand write 3 different pieces of documentation to accompany the load, instead these three documents were electronically generated with minimal data entry required by the user. The data entry was reduced because the 3 documents share common elements and these details only had to be entered once by the user.
3. Cattle reconciliation was much easier with printed documentation. There was no longer the issue of having to interpret illegible handwriting. Load receipt acknowledgment was also improved via electronic communication.

Transferring Between Abattoir and Coldstore

1. As previously, Nolan Meats had already implemented barcodes with pallet labels, the transition to GS1 barcodes meant simply a change in barcode on the box. This therefore did not decrease the time taken to scan to a truck.
2. The preparation of the MTC for the Coldstore cost saving was over estimated at $0. With the GS1 system, it still takes time to fill in a few fields on the MTC, digitally sign it and print the look-alike copies.
3. The same situation occurred with scanning cartons into the Coldstore as scanning them out of the Abattoir. The time taken to physically scan the labels was the same.
4. This was a significant time saving as no physical paper work needs to be returned to the abattoir for archival purposes.
5. MTC reconciliation process was much easier and load acknowledgement was sent electronically. The look-alike paperwork that accompanied the load still needed to be signed and filed.

<u>Yearly Savings figures</u>

On the surface, these savings do not appear to be significant for Nolan Meats. However if you consider that we send server loads of cattle per week and several loads of cartons per day, any small cost savings will be enhanced when viewed over a year.

	Cattle Dispatch & Receiving	Transfer Between Abattoir and Coldstore
Savings per Load	$71	$35
Loads per week	3	30
Yearly Savings	$11,076	$54,600

As is evident by the table above, these small savings per load equates to a yearly saving of $65,676 for the company.

For the project, the Return on Investment figure is approximately 2 years.

6 What Is Next

Currently the project has completed the entire electronic messaging component needed for supply chain traceability. The eDEC system traces cattle brought into Nolan Meats and the eMTC traces cartons out of Nolan Meats destined for overseas customers.

In the future, further messages may be developed to assist in supply chain traceability. These new messages will also add to system efficiency as projected at the beginning of the project. The messages marked for future implementation are designated by dashed lines.

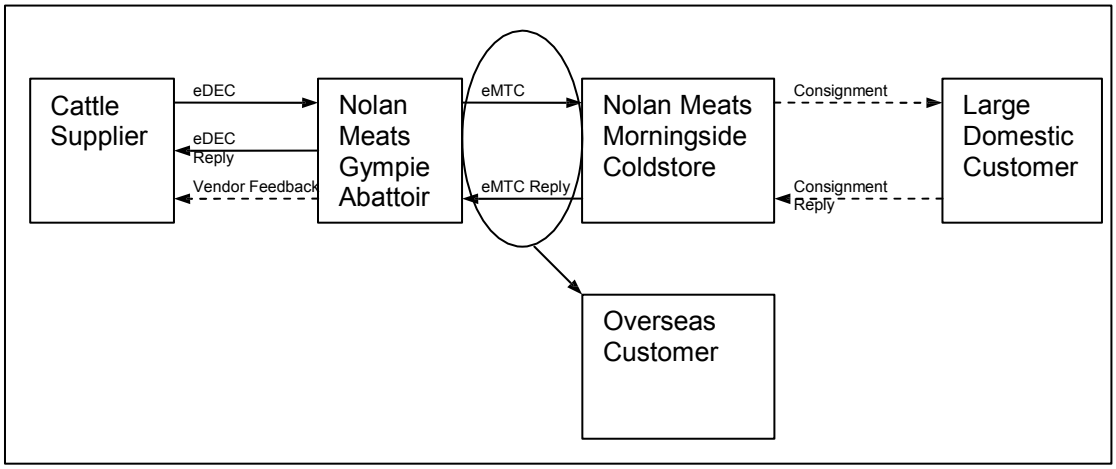

Figure 30 – Electronic Messaging Structure (With Future Development)

After the implementation of these messages the initial cost savings will be observed only when trading between Nolan Meats internal departments. Trading beef cattle between Nolan Meats Feedlot and Nolan Meats Abattoir is one such example. However, the full cost saving benefits of the system will only be realised when all trading partners adopt the technology. This is because the system relies on trading partners being able to send and receive the GS1 compliant messages.

7 Implementation Guideline

Checklist for successful GS1 integration

1. *Have support from upper management to champion the project*

2. *Investigate your current system to determine where GS1 is applicable in your company.*
   a. Investigate the application of GS1 barcodes to:
      i. Retail trade items (if applicable)
      ii. Non retail-trade items (if applicable)
      iii. Items of variable data (carcass and carton products etc)
      iv. Logistical units or SSCC (Serial Shipping Container Codes) – This may be applicable to shipments or pallets traded.
   b. Investigate Electronic Messaging systems
      i. Industry approved messaging systems
         - EDEC (Electronic National Vendor Declaration, Meat Standards Australia Declaration & National Feedlot Accreditation Scheme Declaration)
         - EMTC (Electronic Meat Transfer Certificate – AQIS)
      ii. Drafted/Proposed Messaging Systems
         - e Vendor Feedback (Electronic Vendor Feedback)
         - Domestic Meat Transfer Certificates
      iii. Other Electronic Messages supported by GS1
         - Electronic Ordering
         - Electronic Invoicing
         - Product Inquiry
         - Product Data
         - (Please Refer to GS1 for further electronic messaging systems)

3. *Contact GS1, become a member and obtain a company prefix*

4. *Determine Software and Hardware requirements for the implementation of GS1 Barcodes*
   a. Determine hardware required to generate GS1•UCC barcodes
   b. Determine if any modification to hardware housing is required (Is the printer required physically larger or smaller than existing printers?)
   c. Investigate any hardware required to scan the GS1•UCC barcodes
   d. Investigate software modifications to incorporate the product numbering system for GS1 barcodes
   e. Investigate software modifications to generate the barcodes and to scan the barcodes into your system

5. *Implement GS1 barcodes*
   a. Perform all pre-implementation structural work
   b. Thoroughly test any software system in a test environment
      i. Test generating barcodes
         - Experiment with label layout
         - Experiment with print speeds
         - Experiment with print heat (Thermal labels only)
      ii. Test scanning of the barcodes
         - Do the barcodes scan well?
         - At what distances does the barcode scan easily?
         - Does the software recognise the format?

iii. Confirm with GS1 if the GS1 barcode is formatted correctly

c. Train end users of the system in a test environment
   i. Users need to know how to operate new software
   ii. Users need to know how to operate any new hardware
   iii. Teach users how to interpret the GS1 barcode
   iv. Teach users any new numbering system associated with GS1 barcodes
d. Choose a clean cut off point to implement the new system (For example first thing Monday morning)

6. *Evaluate and fine tune GS1 barcodes*
   a. Review print quality
      i. Adjust print speed, label layout or print heat as necessary
   b. Review quality of scanning
      i. Adjust print speed, label layout or print heat as necessary

7. *Implement Electronic Messaging*
   a. Investigate any hardware or software requirement for electronic messaging
      i. Hardware (Need access to the Internet)
      ii. Software (Need data entry points and software to generate the electronic messages and Email the messages)
   b. Acquire and setup any necessary hardware
   c. Develop software with the ability to generate GS1COM electronic messages
      i. Test message structures and have them approved by MLA (for Industry standard messages) or GS1 for other GS1COM messages
      ii. Integrate data entry points into existing systems and train users
   d. Develop Software with the ability to generate look-alike documents for industry standard messaging systems (EDEC, EMTC for example)
   e. Approve entire messaging systems with MLA for EDEC and EMTC
   f. Start using electronic messaging system

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9 Glossary

AQIS – Australian Quarantine & Inspection Service
EAN – European Article Numbering
EAN•UCC – European Article Number (EAN) Uniform Code Council (UCC)
EANCOM – Messaging Format based on UN/EDIFACT syntax
eDEC – Electronic National Vendor Declaration
eMTC – Electronic Meat Transfer Certificate
GS1 – the new name of EAN
MLA – Meat & Livestock Australia
MSA – Meat Standards Australia
MTC – Meat Transfer Certificate
NFAS – National Feedlot Accreditation Scheme
NLIS – National Livestock Identification Scheme
NVD – National Vendor Declaration
SSCC – Serial Shipping Container Code

10 References

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2. EAN Australia and Meat & Livestock Australia. Australian Meat Industry Guidelines for Numbering and Bar coding of Non-Retail Trade Items Final Document, January 2002.
3. EAN Australia. Australian Livestock Industry Message Implementation Guideline, Despatch Advice Message Version 20040601